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PHYSICIAN TO THE CARDIAC DEPARTMENT OF THE LONDON HOSPITAL; PHYSICIAN TO THE NATIONAL HOSPITAL FOR DISEASES OF THE HEART

CLINICAL and post-mortem study in close and happy comradeship has led to the use in practical medicine of those very pathological terms, dilatation and hypertrophy, which we have been considering. Yet it is of doubtful benefit to borrow them for use in the wards, where it must be admitted there is difficulty enough in determining the simple fact of enlargement. So I suggest that the term enlargement is preferable and sufficient. In a general sense, however, it is not now sufficient; for by radiology it becomes our duty and privilege to identify particular enlargement of the component parts of the heart—i.e., its various chambers—and the channels by which it fills and discharges. It used to be sufficient to say that a pulse was irregular, now such a statement would be unhelpful unless we specify what kind of irregularity is present. And so from radiocardiology we must ask for more than a revelation of enlargement. It must be definitive and inform us of its site, its development, and its extent. Some have gone further, and wish to see in the form of the heart under certain conditions, and its type of contraction, a means of judging the "tonic" or "atonic" state of the heart. From this by easy paths even spurious terms such as a "flabby heart" have been coined again for radiological circulation. Radiology must keep within the law; it must be open to correction by anatomy, physiology and pathology, and by well-informed clinical medicine.

Before proceeding to enumerate causes of clinical enlargement, one may draw attention to certain practical points of interest. Apart from X rays, the apex-beat is undoubtedly the most useful and convenient sign despite its limitations being so patent. Although a systolic murmur at the apex does often accompany enlargement (dilatation) and result from it, it is so common and its origin is so mixed that it cannot be reckoned a sign of enlargement. The electrocardiogram is often of considerable value where it gives clear evidence of right or of left preponderance, and a large or bifid auricular (P) wave may focus attention upon the size of the auricles. In cardiac hypertrophy from hypertension, the left ventricle is especially hypertrophied, but the right ventricle is often affected to a certain extent. Unless notice is taken of this gap in our knowledge, an observer with X rays may be biased and tend to visualise his ideas into the cardiac shadow exactly as I fear that preconceived ideas often biased the percussor. It has been a good custom to collect all the signs first and from these to build a structure upon which an unprejudiced diagnosis may be reached; and radiological signs should be enlisted to follow the same rule and not to usurp the function of diagnosis.

Sporadically the idea survives that the heart gets larger and larger as age advances, but in the absence of that common cause for it, hypertension, enlargement is not a necessary accompaniment even of great age.[1,2] I have a collection of radiocardiograms of men over 80 which present no enlargement, though the heart is seen to lie more transversely on the diaphragm than in the average adult despite the fact that the diaphragm is often low (Fig. 12). It is quite possible, as Assmann[3] thinks, that this is due to lengthening of the thoracic aorta forcing down the base of the heart from which it arises.

The pertinent question in these days is not merely whether the heart is enlarged or not, but which part of it is enlarged, for enlargement is localised and characteristic in many and varied cardiac lesions. Further, these localised changes in the particular chambers of the heart can be recognised in their early stages and not merely in those late stages which come too quickly into the domain of the pathologist. Following this plan I propose to discuss enlargement of the left auricle, the left ventricle, the right auricle, the right ventricle, in this order, and to take examples of those diseases which particularly affect the chamber under consideration.

Left Auricle

The left auricle might, from its anatomical relations, almost be called the posterior auricle, for it lies against the œsophagus and descending aorta which keep it from the spine. The left auricle is not visible from the front, excepting a tiny portion of the left auricular appendage which adheres to the left border just below the pulmonary artery. It is beyond the reach of percussion, but X rays in the right (I) oblique position show it well, and its posterior border is conveniently outlined by barium in the œsophagus. This important method has now come into current use, for after the presystolic murmur it is the most certain sign of mitral stenosis. Some may be tempted, as I have been, too easily to accept a gentle curve of the posterior border as evidence of enlargement of the left auricle; but the normal variations in this curve are sufficient to render care necessary. It is the abruptness of the displacement of the barium stream as well as its degree which is characteristic; and often the barium is held up in triangular form at the upper end of the left auricle before slowly passing this obstruction in a thinner stream (Fig. 13).

It is becoming important to learn what may be the causes, apart from mitral stenosis, of this demonstrable enlargement. In any patient with auricular fibrillation which has lasted long enough, the left auricle may show change in this direction (Fig. 14). In complete heart-block it often looks prominent. Great difficulty sometimes arises where the left ventricle is greatly enlarged and where the left auricle is simply pushed backwards by it. In such a case the barium convexity is often long and pronounced, though not placed so high or displaced so brusquely as with the special auricular enlargement of mitral stenosis.

The recognition of gross (or aneurysmal) dilatation of the left auricle in mitral stenosis has been often reported in recent years and we find it more common than is usually thought. It should be emphasised, however, that among patients with mitral stenosis may be found every grade of left auricular enlargement from that which is doubtful (and then one should say so) to that which has been labelled aneurysmal dilatation. Curiously enough, not only does the left auricle lie posteriorly so that almost nothing of it is seen from the front, but when it enlarges it nearly always enlarges to the *right* so that it begins to appear on the right border of the heart at a little higher level than the right auricle, the border of

* The second Lumleian lecture for 1936 delivered before the Royal College of Physicians of London on March 19th. The first lecture appeared last week.

which it gradually passes (Fig. 15), if the clinical course happens to extend over years. As you know, the most extreme enlargement allows extension of the left auricle to the right axilla where it has even been tapped as if it were a right pleural effusion (Fig. 16). It possesses clinical features of great interest, such as the moderate symptoms which may accompany a heart so hugely dilated, a clinical contrast with the patient so ill with a comparable ventricular enlargement as from hypertension.

Left Ventricle

As the left border of the heart when seen from the front is formed by the left ventricle, enlargement is often easy to recognise, and displacements are the chief source of difficulty and a familiar one. In health, the apparent size of the left ventricle depends much upon the height of the diaphragm. Right ventricular hypertrophy, whether from extreme pulmonary disease or from congenital lesions, can displace the left border of the heart outwards and simulate enlargement of the left ventricle.

The causes of left ventricular enlargement are familiar; aortic stenosis, whether rheumatic or atheromatous, gives a picture very like that of aortic incompetence, though seldom is the heart so large, and with the latter there is more pulsation both in the heart and in the aorta. It may at once be asked whether X rays help in the separation of rheumatic from syphilitic aortic incompetence, the two common varieties of aortic leak? The distinction can only be drawn by establishing a coincident and characteristic change in the aorta, either an aneurysm or such a degree of dilatation or pouching as could not be simulated by the dynamic dilatation of the ascending aorta in free rheumatic aortic incompetence (Figs. 17 and 18). Cardiac enlargement from syphilis, in the absence of aortic incompetence, is a rare occurrence.

The other common cause is hypertension, which even now is scarcely appreciated at its full value as a source of cardiac enlargement. In the absence of valvular disease there is nothing like hypertension for compelling cardiac enlargement. The term cardiovascular hypertrophy was introduced by Turnbull[109] for the anatomical counterpart of clinical hypertension. There is not only hypertrophy of the heart, chiefly though not exclusively of the left ventricle, but there is also hypertrophy of the media of the muscular arteries, and this should form an integral part of the criteria of enlargement from hypertension.

Coarctation (congenital stenosis) of the aorta is worth remembering as a rare cause for enlargement of the left ventricle, with hypertension affecting only the upper part of the body.[36]

Even where it is most expected as in aortic incompetence or hypertension, one may not assume that radiological evidence of enlargement will invariably be found; such retention of normal size against odds is a cardiac event which may some day be found to possess clinical interest and significance.

FIG. 12.—Normal heart, anterior view. Healthy man aged 93.

FIG. 13.—Mitral stenosis. Teleradiogram, right (I) oblique position. Barium in the œsophagus passes over the aorta (aortic bed) and is then held up by the enlarged left auricle which projects into the posterior mediastinum.

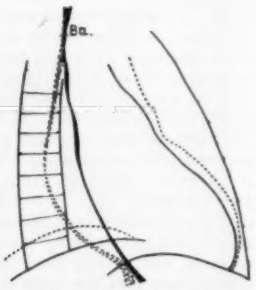

FIG. 14.—Auricular fibrillation without mitral stenosis. Enlargement of left auricle outlined by barium in the œsophagus (continuous line), and greater enlargement six years later (dotted line).

Cardiac aneurysm has been the subject of numerous pathological reports for generations, and in his well-documented study in 1903, Dr. Donald Hall[45] took the modern view that it is rarely syphilitic, and almost always due to coronary atheroma. Now that coronary thrombosis has become a frequent clinical diagnosis, it would not be surprising if cardiac aneurysm were to follow suit, for X rays make it possible to see the aneurysmal bulge in a fair proportion of cases. As you know, it is the apical portion of the left ventricle which is most often affected, and this lies within our radioscopic vision. Most typical is a localised promontory even to angulation on the left border of the heart seen from in front (Fig. 19). In one such case, however, necropsy showed me that the prominence mistaken for a cardiac aneurysm was, in fact, the apex of the heart lifted by the aneurysm itself which lay upon the diaphragm. In the right (I) oblique position, I have seen an aneurysm fill the anterior lung space at its lower part and prevent the normal illumination of this part of the space even during deep inspiration. It will be apparent that an extensive aneurysm may simulate very closely an ordinary hypertrophy of the left ventricle; and this was so in one patient where necropsy revealed an extensive aneurysm involving the lower half of the left ventricle. Once I saw a line of calcium in this region, almost parallel and just internal to the left border, permitting the diagnosis of calcified aneurysm which was confirmed. The almost constant thrombosis within a cardiac aneurysm brings additional clinical risks.

The Size of the Heart after Coronary Thrombosis

Coronary thrombosis is so clear a proof of coronary atheroma that it may serve as a basis for studying enlargement in coronary disease.

Hypertension is by far the most frequent and important cause of the enlargement which is often seen. So true is this that even with normal blood pressure at the time of examination, past hypertension should be held responsible for left ventricular enlargement unless aortic stenosis or some other known cause explains it; or there is in the history good evidence to the contrary. But when a patient is known to have had normal blood pressure for years prior to the attack, or when enlargement begins to develop after it (still without raised blood pressure), then the interesting question arises as to whether or not coronary disease itself causes enlargement.

Evidence has been collected that hypertrophy may be produced by interference with the proper blood-supply of the myocardium. If that is so, there is theoretically no reason why the same result should not follow coronary obstruction. Cardiac enlargement is known to occur in experimental [38] and clinical [5] anæmia; in cases where an anomalous coronary artery arises from the coronary sinus [22 13]; and in deficient coronary flow.[100 71]

That coronary disease is actually a cause of hypertrophy has not been conclusively proved. *Experimental* evidence is contradictory.[101 107] *Pathological* evidence is complicated by the notorious difficulty of excluding the possibility of hypertension. Nemet and Gross [84] found it difficult to believe that coronary sclerosis is an important factor in the development of hypertrophy, and Bell and Clawson [10] went so far as to state that such a conception is physiologically unsound. Lisa and Ring [72] were unable to estimate the importance of coronary disease as a factor in causing hypertrophy; Nathanson [83] could find no relation between the degree of fibrosis and the size of the heart. Miller and Weiss [80] published a series showing no gross hypertrophy. On the other hand, Bartels and Smith [8] reported 37 cases with necropsy and previously had reported two others [103] in which all known causes of enlargement, including hypertension, were believed to have been satisfactorily excluded, and where the hypertrophy was ascribed to coronary disease alone. But their results have been criticised and it does seem likely that hypertension had operated in some of their cases. *Clinical* evidence controlled by X rays is scanty and it is largely negative. Horine and Weiss [51] report 20 cases in which enlargement did not supervene during periods averaging four years after the attack.

In the last few months Dr. J. H. Palmer has investigated and will shortly publish a series of 200 patients who have been under my observation for extended periods following coronary thrombosis and where there were X ray records. The evidence of enlargement has been judged by radioscopy and by inspection of teleradiograms. The average period elapsing between the attack and the last X ray examination was about three years; 40 cases were examined at intervals during more than five years.

Among the whole 200 cases of coronary thrombosis were found 128 (64 per cent.) in which the heart was enlarged. There was every reason to think that hypertension was the predominant or single cause of enlargement in 106 (82·8 per cent.) of these 128 cases. In 4 cases (3·1 per cent.) there were associated but incidental factors which were accepted as causative. In 7 cases (5·5 per cent.) the cause for the cardiac enlargement could not be ascertained, though both factors of hypertension and coronary sclerosis may have been at work.

By process of exclusion we found that coronary thrombosis was the sole factor in producing enlargement in 4 patients—i.e., 3·1 per cent. Each of these was known to have had normal blood pressure prior to the attack, and hearts of normal size when the attack occurred. To these 4 patients should be added 4 others (3·1 per cent.) in whom cardiac aneurysm was diagnosed by X ray, one confirmed by necropsy. No figures of their blood pressure before the attack are available, but it was not raised subsequent to the attack. A further addition of 3 patients (2·4 per cent.) who showed a bundle branch lesion might be made, for this is fair evidence of coronary disease, and in two it arose after the attack. If in these last three groups the enlargement was directly the result of coronary thrombosis, we have a grand total of 11 (8·6 per cent.) where we believe that cardiac infarction was the single cause of enlargement.

FIG. 15.—Mitral stenosis. Teleradiogram, anterior view. The left border is straight from aortic knuckle to apex from filling out by the pulmonary artery and the conus. The bulge on the right border is caused by enlargement of the left auricle to the right and behind the right auricle.

FIG. 16.—Aneurysmal dilatation of left auricle. Mitral stenosis. Auricular fibrillation. Post-mortem control. Teleradiogram, anterior view. In the right side of the thorax the *left* auricle extends to the right axilla.

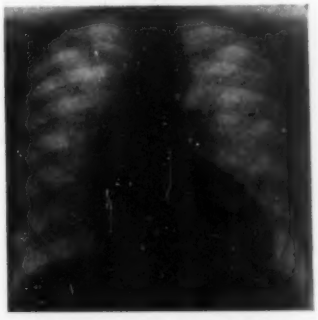

FIG. 17.—Rheumatic aortic incompetence. Teleradiogram, anterior view. The left ventricle is enlarged as shown by extension of the left border ot the left and increased convexity of it. The ascending aorta is unduly prominent (dynamic dilatation).

Right Auricle

The right auricle is as clearly visible from in front as is the left ventricle. Tricuspid stenosis is so very rare compared with mitral stenosis that we do not expect often to see much enlargement of the right auricle. The effects of auricular fibrillation are shown in course of time by enlargement of both auricles. If there is tricuspid incompetence either from valvulitis or more usually from enlargement of the right ventricle late in mitral disease, some enlargement of the right auricle is a natural sequence.[39 50] This is to be seen also in late stages of pulmonary disease, but the rarity of auricular fibrillation in failure from this cause makes right auricular (and also left auricular) enlargement late or little pronounced. In congenital defects of the auricular septum the right auricle is enlarged to an extreme degree, especially where with it there is coexistent mitral stenosis—Lutembacher's disease.[74 78] It is well, where the increased prominence of the right auricle is found, to look for increased breadth of the vascular pedicle from distension of the superior vena cava, which clinically we should expect in association with distended veins in the neck.

It will be agreed that isolated dilatation of the right auricle is most exceptional. For this reason I am fortunate in being able to show records of such a case, thanks to the courtesy of Dr. Cotton. A man of 39 suffered an illness like coronary thrombosis two years before he came to hospital with cardiac dyspnœa, when a most unusual enlargement of the heart was noted (Fig. 20). Necropsy showed absence of valvular disease, and an aneurysmal dilatation of the right auricle, but no evidence of coronary thrombosis affecting the auricular branches.

There are certain simulations of right auricular enlargement, and Bordet [16] points out that enlargement either of the left ventricle or of the right ventricle may displace the right auricle as a whole to the right, and give a false impression of right auricular enlargement. An aneurysm of the ascending aorta may lie so low on the right of the cardiac shadow (even reaching the diaphragm) that it hides the right auricle. More surprising still is the arteriosclerotic aorta which in its tortuous descent in the mediastinum can actually appear as a shadow behind the right auricle and going beyond it (Fig. 21). Once I saw a doubtful shadow in this region which proved to be that rarity a low œsophageal pouch (Fig. 22). This is similar to a figure published by Berg,[11] where the intruding shadow was a para-œsophageal hernia.

Right Ventricle

There was once much controversy, and a great heresy as Dr. Graham Steell says in his book, about the nature of the pulsation in the second left interspace, for it was thought to be due to pulsation of the left auricle, although it is only the appendix of the left auricle that comes to the front, a part of the chamber least likely to become dilated and often found plugged with clot. The pulsation is now accepted as due to the pulmonary artery and the conus (or infundibulum) of the right ventricle, one or both of these. The conus has acquired a new importance as part of the right ventricle, simply because it becomes radioscopically visible on the left border as the only portion of the right ventricle which can be seen from the front. Fortunately, in addition, the right ventricle forms part of the cardiac outline when the subject is turned well to the right, the left (II) oblique position, about 60°.

The causes of right ventricular enlargement include chronic pulmonary disease, many congenital malformations—e.g., Fallot's tetralogy—and late stages of congestive failure from almost every cause. In the beri-beri heart, enlargement affects especially the right auricle and right ventricle.

I will expand these remarks on the right ventricle to include some observations which Dr. Clifford Hoyle and I have undertaken in the last two years in the cardiac department of the London Hospital.

FIG. 18.—Syphilitic aortic incompetence. Teleradiogram, anterior view. The left border is rounded and extends to the left (large left ventricle). The ascending aorta is not only prominent but irregular in outline, and on the left the aortic knuckle is large and merges in the descending aorta.

FIG. 19.—Aneurysm of heart. Post-mortem control. Teleradiogram, anterior view. Angulation on left border.

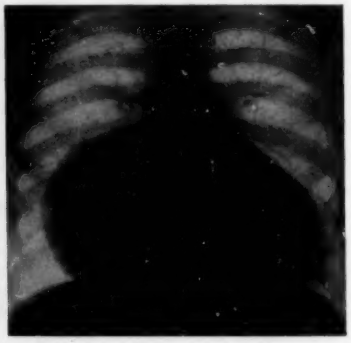

FIG. 20.—Aneurysmal dilatation of *right* auricle. Post-mortem control. Cause undiscovered. Teleradiogram, anterior view.

Pulmonary Causes of Right Ventricular Enlargement

EMPHYSEMA

When a patient suffers from chronic bronchitis and emphysema, it is often hard to tell to what extent, if any, the heart is secondarily affected and is contributing to his troubles. The symptoms have much in common, dyspnœa being paramount; and

the arts of percussion, palpitation, and auscultation are of little service in deciding the point. Under these difficulties we are driven to search for some newer method of investigating the heart if we believe that judgment on enlargement will be of value. If it were not, then we should have to rely solely upon signs of heart failure, which are less distinctive in a patient often orthopnœic from pulmonary disease. Enlargement of the liver with œdema of the legs would naturally settle the question. Still, it would be well for us to be able to recognise that the heart is involved before the patient reaches so late a stage, which in this form of heart failure is seldom less than the terminal stage.

Until recent years the literature on the heart in emphysema, taking a common form of pulmonary disease, consisted chiefly of pathological reports describing enlargement of the right chambers, and later of the pulmonary artery. The differences of opinion have centred upon the relative frequency of cardiac involvement, the unilateral or bilateral effect upon the heart chambers, and the possibilities of cardiac failure directly due to right-sided enlargement from this and similar lung disease. The ultimate cause for pulmonary hypertension and cardiac change may be one or more of three recognised histological changes. First, destruction of the lung tissue with the finer pulmonary vessels, which is inseparable from emphysema and characteristic of it. Secondly, sclerosis of the finer branches of the pulmonary artery and later of its stem. Thirdly, endarteritis of the pulmonary arteries. Though no one doubts that these last two are occasionally reflected in the right ventricle, neither has been often enough reported on good authority to account for the large proportion of cases of emphysema which do show evidence of right ventricular enlargement or pulmonary artery dilatation, or of both. For this reason I cannot help thinking that the over-distension and eventual destruction of the alveoli and larger elements of lung tissue with their fine vascular content is amply sufficient to embarrass the right ventricle and to provoke a hypertrophic response. Supporting evidence is the fact that right heart changes are chiefly or only seen in chronic pulmonary tuberculosis when there is extensive fibrosis which mechanically produces a comparable destruction of a large part of the finer vascular branches in the lungs. However this may be, the agreed essential factor is a raised tension in the pulmonary circuit—a hypertension of the lesser circulation comparable with the hypertension of the greater circulation which is so mighty a cause of left ventricular enlargement.

The frequency of cardiac enlargement in emphysema is far greater than the incidence of heart failure from this cause might lead us to expect. There is no doubt that associated cardiac disease, hypertension especially, is not only often combined but is also the more powerful cause of failure and death. Many are of an age when they are liable to myocardial disease, and electrocardiographic evidence of it may be present; some die of pulmonary complications proper. Though heart failure from pure emphysema is uncommon, no pathologist seems to doubt that some degree of enlargement of the heart in emphysema is common.

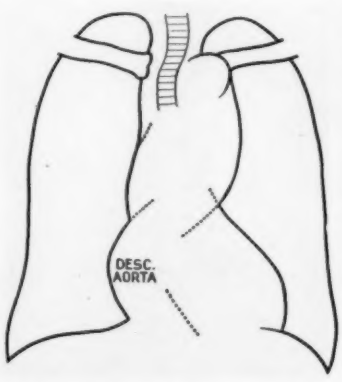

FIG. 21.—Arteriosclerosis. Tortuous aorta, forming right border of "cardiac" outline (from teleradiogram, anterior view).

FIG. 22.—Œsophageal pouch (lower end), simulating enlargement of right auricle. Teleradiogram, anterior view. The shadow on the right was identified after ingestion of barium.

FIG. 23.—Emphysema. Enlarged conus of right ventricle. Teleradiogram, right (I) oblique position.

Radiological Changes in Emphysema.—Many writers have thought that, far from being enlarged, the heart is smaller than the normal. The small cardiac shadow (the genesis of this belief) is due to the low position of the diaphragm with consequent swinging of the heart towards the middle line together with some rotation of the heart on its long axis in a counter-clockwise direction.[26] Such is the drop-like or ribbon-like heart in its simplest form, though it is occasionally seen in a normal person of slight build and long thorax as well as in a small proportion of tuberculous and emphysematous patients.

Dietlen was one of the first to describe the heart changes in emphysema,[28 29] mentioning a blunting of the right cardiophrenic angle due to participation of the right ventricle in the right border, prominence of the pulmonary artery and of the conus (infundibulum) of the right ventricle. He knew that when the left ventricle was normal there would not necessarily be an increase in the apparent size of the heart shadow. Partly for this reason and partly influenced by the frequency of associated cardiovascular lesions, a number of observers have found difficulty in discovering enlargement among emphysematous subjects.[3 62 69] Some previously doubtful

now admit that the heart is affected in the majority of patients with emphysema.[63] Even Vaquez and Bordet [110] are surprised at the infrequency of change even in very chronic cases, and when present found it was of the "sabot" type or at least there was an increased transverse diameter from the enlarged right ventricle. Even more advanced, and each with failure, were the group of cases described so ably by Lutembacher under the title of "Terminal tricuspid syndrome in chronic lesions of the lung." [73] Here also the heart was characterised by gross enlargement of the right ventricle and prominence of the pulmonary arc. Assmann [3] affirms that fairly regularly a hypertrophy of the right ventricle is present in emphysema.

Dr. Clifford Hoyle and I have been interested in this subject, and have collected some evidence during the last two years of the changes in the size and shape of the heart in emphysema. We have had at our disposal about 75 cases where emphysema was undoubted, though we like others found repeatedly that the coexistence of hypertension and of other cardiovascular disease complicated the inquiry. It is admitted that pure cases of so-called emphysema heart are not frequent, and that failure from this single cause is infrequent. On the other hand, it was established that slight changes in the size or form of the heart were present in a large proportion, perhaps in half the cases of unselected and consecutive emphysema. Some of the simpler current measurements of the heart's size were tried, but they proved inapplicable to right ventricular enlargement which was what we sought to measure. The cardiothoracic ratio is invalidated by the excessive width of the chest in emphysema. The simple transverse diameter was found to be so little affected that it was useless as a measure of the right ventricular enlargement which was demonstrable in the conal prominence and other signs about to be described. Recently Binhold [13] has applied Kahlstorf's method [53] of volumetric measurement which is based not only on the surface area of the orthodiagram but also on the depth of the heart, to a series of emphysematous patients and found that the heart volume lay at the upper limit of normal and sometimes exceeded it.

The small drop-like heart and the large "sabot" heart were rarely seen. It is not that cardiac enlargement is absent, as some have supposed, but that the signs of right ventricular enlargement are different and elusive, being not nearly so patent as the signs of left ventricular enlargement to which ordinary physical signs are so largely directed. If in addition the left ventricle is enlarged, it is nearly always explained by hypertension past or present, or else by a myocardial factor.

Right ventricular enlargement is most commonly shown by undue prominence of its conus as seen from the front or far better as seen in the right oblique (I) position (Fig. 23). The pathological and experimental evidence from Kirch, already discussed, points to the conus or far end of the outflow tract of the right ventricle as the seat of the first change when resistance rises in the pulmonary circulation. The right ventricle lengthens rather than widens, and this is often missed if one looks for a widening of the transverse diameter of the heart from the front in emphysema.[64 85 120]

FIG. 24.—Emphysema. Enlarged right ventricle. Teleradiogram, left (II) oblique position. Note also dense left pulmonary artery crossing below arch of aorta.

FIG. 25.—Emphysema. Prominence of pulmonary artery (middle arc), and prominence of both its branches. Teleradiogram, anterior view. Post-mortem control.

FIG. 26.—Goitre. Auricular fibrillation. General enlargement of the heart (ham-shaped). Teleradiogram, anterior view.

This prominence of the conus is commoner and more pronounced than enlargement of the body of the right ventricle. The indications of the latter are said to be a blunting of the right cardiophrenic angle from the appearance there of a right ventricular element in addition to the right auricle.[29 81] This is hardly established, but workers with kymography will probably settle the question in time. Certain it is that the body of the right ventricle is better seen with the subject in the left (II) oblique position, rotated to about 60°, when the lower right (or ventral) border of the heart is formed by that chamber (Fig. 24). At a smaller angle of rotation, as confirmed recently by valuable researches by Laubry and his co-workers,[66] the right auricle forms the limit of the cardiac shadow. Though there is much normal variation in this large curve, in emphysema it is often so large and rounded that no doubt can be felt that it represents enlargement of the body of the right ventricle.

The next radiological feature of the emphysema heart is the prominence of the pulmonary artery in the anterior view (Fig. 25) and the dilatation of its branches. The large drooping branches of the pulmonary artery as seen from the front have been said to look like a moustache. There is both increased

width and increased density of these shadows which need no longer be confounded with non-vascular or bronchial changes. In the left (II) oblique, the left pulmonary artery can easily be followed in a normal film, but in emphysema its size and density are excessive (Fig. 24).

In clinical medicine there is no better example of pure right ventricular hypertrophy than that which occurs in an advanced and uncomplicated case of pulmonary emphysema. In pulmonary hypertension from emphysema there is not the special involvement of the left auricle which modifies the picture so greatly in mitral stenosis, nor the presence of auricular fibrillation which in itself is quite capable of altering the size and form of the auricles at least, and maybe in time of the ventricles.

We leave our study of the heart in emphysema with the feeling that the analogy between pulmonary hypertension in its effect upon the right ventricle, and arterial hypertension in its effect upon the left ventricle, is a correct and considerable one. The emphysematous patient is liable to broncho-pneumonia and other such risks, and he is old enough to have some degree of coronary disease as well; but he is spared the disadvantages and the earlier failure of fibrillation. Compared with him, the hypertensive patient has his cerebral risks, and he is still more often the subject of coronary disease. As regards fibrillation, though this is not the rule with hypertension even in its final stage, it is met more commonly than in pulmonary heart disease. Sclerosis of the pulmonary artery and its branches is the appropriate result or concomitant of pulmonary hypertension, and greatly modifies the occasional case, though not nearly so often as general and local arteriosclerosis alters the course and consequences of arterial hypertension.

Although I have spoken freely of right ventricular in contrast to left ventricular enlargement, when it comes to failure I feel that while the separation into right heart failure and left heart failure will help us to a better understanding of the factors in operation, it will not alter the fact that patients actually in a state of congestive heart failure are very much alike. Indeed, I think that there is more difference between a congestive failure with fibrillation and one without, than there is between what is distinguished as right heart failure and left heart failure.

TUBERCULOSIS

In chronic pulmonary tuberculosis the heart often looks small though it is not smaller than normal except with bodily wasting. The idea that its smallness is a hypoplasia which disposes to tubercle is not now strongly held. Where there is much fibrosis, the changes in the right ventricle and pulmonary artery described under emphysema will sometimes be found. As a factor contributing to the symptoms, the displacement and distortion of the heart should be taken into account.[23 20] In a series of 120 cases of pulmonary tuberculosis, Hirsch [46] found right ventricular hypertrophy in 35 per cent., and it appeared to be correlated with the extent of pleural and pulmonary fibrosis. There are also good pathological studies by Brown [19] and by Mayer.[76] Early orthodiagraphic measurements were made by Achelis [1] and later X ray studies have been made by King and Hansen.[57] An extensive thesis on the subject with a good bibliography and references to the X ray appearances has been written by Godel.[43]

A general conclusion would be that the heart in pulmonary tuberculosis is enlarged only from other associated causes, or that it is a right-sided enlargement from fibrotic or emphysematous change in the lung tissue involving the pulmonary circuit. The fact should be considered by those who wish to see in toxæmia, whether general or even trivial and focal, an excuse for what is really an ill-considered or a fanciful diagnosis of "a slightly enlarged heart" or "a slightly dilated heart." The heart in advanced tuberculosis after years of tachycardia and mixed infections of all kinds with pyrexia presents no enlargement. Examples of heart failure, even under these conditions, are the rarest.

PNEUMOCONIOSIS

Pulmonary heart disease is not rare in pneumoconiosis, and Dyson [31] found evidence of it in 18 of 127 cases where there was reason to expect pulmonary obstruction. He has also given a description of the radiological changes in 5 cases [32] which are comparable with those which Hoyle and I have found in emphysema.

Spinal and Thoracic Deformities and their Effect upon the Heart Size

Apart from the slight and the great displacement produced by scoliosis and kyphoscoliosis, these deformities have long been known to be capable of causing actual cardiac enlargement. Historical references have been quoted in the papers by Boas,[15] Edeiken,[33] and Rösler.[92] Most observers have stressed the involvement of the right side of the heart, and believe this follows obstruction in the pulmonary circulation from emphysema or from the considerable compression of the lung in the deformed thorax (hunchback's heart). Needless to say, lung complications are frequent; and there is reason for thinking that the effect upon the lungs is essentially more important than any primary effect upon the heart, which is difficult to understand unless there is actual compression of it. None the less, some of the largest hearts on record have been described and presumably correctly interpreted in this condition, though it is hard to believe they are anything but rare if kyphoscoliosis is the only cause in operation. As would be anticipated, a variety of peculiar patterns have followed the extremes of angular kyphosis of tuberculous origin, such as the case of acute angulation of the aortic arch recorded by Carey Coombs,[24] and cases described by Finley.[37]

The radiological evidence of enlargement in such a misshapen chest has to be accepted with great reserve, and anyway it has less importance if we admit how rarely these heart conditions are seen nowadays either clinically or pathologically. The radiology of the heart in thoracic deformities has especially been studied by Rösler.[92] Incidentally, just as a curvature to the right near the stem of the heart may superficially resemble an aneurysm, so may the rarer curve to the left simulate a prominence of the pulmonary artery. The funnel chest has some interest, though even when extreme it may not be accompanied by any cardiac or pulmonary disorder.[34] It is a potent cause of heart displacement to the left, for there may even be no room for the heart between the depressed sternum and the spine. In modern times extreme angular deformity from tubercle, which used to provide curious heart affections, is happily seldom seen.

Pulmonary Artery

Although anatomically not a chamber of the heart, the stem of the pulmonary artery is so distinct and important a part of the cardiac outline that it must at least be mentioned in considering heart size. Besides, the branches of the pulmonary artery are seen to such advantage and profit in so many cardiac

diseases that they merit full attention. No one can deny that the entry of the pulmonary artery into an important place in clinical cardiology in recent years has been as much due to radiology as to pathology.

The pulmonary arc may be simulated in displacement of the heart to the left by any cause, including localised pleural adhesions. Once, Dr. Bedford and I found a pulsating swelling of the middle arc and at first thought it to be an aneurysm of the pulmonary artery. Further X ray examination made us revise our opinion and later at necropsy it was found to be an aneurysm of the ascending aorta which had invaded the natural territory of the pulmonary artery and eventually perforated into the conus.

Of congenital malformations with clinical interest should be mentioned patent ductus arteriosus and auricular and ventricular septal defects. Of acquired lesions, there is simple distension of the pulmonary artery in mitral stenosis, congestive failure, and (sometimes early) the goitre heart. Disease of the pulmonary artery itself include atheroma, both senile and secondary to mitral stenosis or congenital defects, and the rare syphilitic lesion. When the finer branches of the pulmonary artery are affected, or at least when there is pulmonary hypertension, the pulmonary artery enlarges in chronic pulmonary disease, and if the lesion is syphilitic, Ayerza's disease in its most typical form may result. An aneurysmal dilatation of the pulmonary artery is far more often associated with a congenital defect than with syphilis.†

Enlargement of the Whole Heart

This is well seen in combined lesions such as mitral stenosis with aortic incompetence or stenosis, or less often with incidental hypertension. In the severest forms of rheumatic carditis we have seen that the heart may enlarge as a whole. In the advanced stages of congestive heart failure from whatever cause there is general enlargement of all chambers; and incidentally the lack of visible pulsation in the heart under these circumstances may be striking.

The heart affected by goitre is sometimes found enlarged, though years may pass before it is demonstrable. Whenever auricular fibrillation supervenes, as so often it does, enlargement can be expected. Some years ago Dr. Cookson and I [87] published a series of observations on the size and shape of the heart in goitre and gave examples of the early change characterised by prominence of the pulmonary artery; of the middle stage with moderate enlargement of the whole heart, supposed to be ham-shaped (Fig. 26); and of the final stages with congestive heart failure with further enlargement and prominent signs of pulmonary congestion. Later, Dr. Hoyle and I drew attention to a frequent association we termed thyrotoxic hypertension,[88] which naturally modifies the radiological picture. Since then the pathological evidence about enlargement from this cause has been strengthened [56] and careful cardiometric observations in life have been carried out.[75] No longer need other cardiac causes be requisitioned to explain the enlargement which can and often does result from thyrotoxicosis alone.

If time permitted I would refer to the general enlargement of the heart which follows an arteriovenous aneurysm and which may largely disappear after operation. The considerable enlargement which sometimes occurs in myxœdema has often been reported, recently by Campbell and Suzman,[21] and also occasionally in severe and chronic anæmia where the cardiac enlargement resembles that seen with goitre.

When a considerable enlargement of the heart is encountered and no single cause or combination of causes seems sufficient to account for it, we should consider a past hypertension, or else a latent mitral stenosis for the characteristic murmur is sometimes lacking over a long period. Similarly, an unusual combination of congenital defects may account for such a difficult problem. Occasionally a tumour mass or a collection of fluid such as a mediastinal pleural effusion or a pericardial cyst will give difficulty, or even an unusual extension of an aortic aneurysm. There is such a condition as acute isolated myocarditis,[97 99] and cases of "idiopathic" hypertrophy are published from time to time,[113 68] most often in children.[65]

Prognosis and Cardiac Enlargement

There is much truth in the statement that the larger the heart the worse the prognosis, though it could seldom be applied strictly to an individual patient. It assumes, often correctly, that enlargement is a fair index of the severity of the myocardial lesion and of the liability to failure. We cannot expect much from either time or treatment when the left ventricle is gross. Auricular enlargement is borne better and longer than ventricular. Increase in size being almost inseparable from particular lesions, in these it may also be said that relative to the lesion the smaller the heart the better the prognosis, for smallness is a fair measure of comparative myocardial health. Grant,[44] from his valuable analysis of after-histories for ten years of 1000 men suffering from heart disease, concluded that the grade of enlargement, with that of failure, provides the most satisfactory basis for prognosis.

Another statement might be made, with reserve, that the heart once enlarged is always enlarged. It is undoubtedly true of the average patient with valvular disease or hypertension, for it is nearly always a slow but steady development of enlargement which is recorded by consecutive X ray examinations over years. The volume of a heart chamber indicates not only the stress to which it is subject and the state of its walls, but also its disposition to intracardiac thrombosis which notoriously adds gravity to the prognosis. In most cases of coronary thrombosis a mural thrombus is found post mortem in the left ventricle. In most cases of auricular fibrillation there are thrombi in the auricles. Treatment by quinidine does furnish one clear example of the possibility of the *prevention* of enlargement. Whenever a patient is seen shortly after the onset of auricular fibrillation, and it is the only sign found, it is our bounden duty to stop this arrhythmia by quinidine (possible, as a rule), not only to prevent the ensuing enlargement but also to avoid the consequent formation of intracardiac thrombi. Dr. Maurice Campbell (personal communication) from a recent analysis of patients treated with quinidine concludes that in deciding whether it is indicated or not, the duration of fibrillation and the size of the heart have almost equal importance. The prevention of enlargement is also brought into prominence by the wonderful effects of partial thyroidectomy in preventing or limiting an increase in heart size in goitre, though contrary to expectation it seldom reduces it.

The communication of the results of radiology to a cardiac patient is fraught with risk of misconstruc-

† On the pathology of the vessels of the pulmonary circulation, the several papers by Brenner in the Archives of Internal Medicine during 1935 may be consulted.

tion. Ignorance of a doctor's meaning can easily induce fear in the mind of a patient, and it is rather the place of a good physician to cast out fear. The best plan is to look upon X ray findings as a physical sign which does not or should not interest the patient except as a means of a fuller diagnosis. The worst of all is to mention enlargement to a patient and his friends when this is doubtful or absent. With a moderate grade of enlargement which conforms with the disease in question, a reassuring note may be sounded. When enlargement is absent the fact should be stressed as a good sign. If we cannot say something encouraging from the X ray examination, it is better to say nothing. The knowledge acquired from a routine X ray examination of the heart is as likely to influence the prognosis favourably as unfavourably. It is unwise to confront a patient with X ray findings as if they implied an added burden of sorts. Few outside the profession are able to visualise or to apprehend without fear what we might mean by saying that the heart is enlarged. In this respect I agree with a charming old lady who said: "Like most of your patients I suppose, I rather prefer to live in a fool's paradise." At least as Dr. Hutchison says [52] it is not every patient who is fit to be told the whole truth about his disease.

Conclusion

Radiology can contribute to direct and exact knowledge in almost every variety of cardiac disease. Let us hope that our younger physicians will not be dilatory in working this field; for we in England are not in this respect yet in step with other countries. Though some will doubtless exaggerate its importance, it will steadily find its proper level among modern means of diagnosis. It is natural to regard with suspicion anything unfamiliar, and it is our duty to scrutinise any new method; but let not this defer our acquaintance with radiology of the heart—a novelty no longer. The modern physician will have his diagnostic powers extended and refined by adding radiology to his scheme of examination; he will supplement traditional methods by direct inspection of the internal organs.

In this office it is for me to express a considered opinion about enlargement of the heart and the means of its ascertainment. Cardiology is now an important and integral branch of general medicine, nothing more and nothing less. It will advance and develop beyond a post-mortem pathology which is static. By radiocardiology we shall reach a more vital anatomy and physiology, and—earlier in disease—a dynamic pathology of the living heart.

In the preparation of these two lectures I have to acknowledge the generous help I have received. I am grateful to Prof. H. M. Turnbull and Dr. W. W. Woods of the pathological department of the London Hospital; to Dr. William Evans, Dr. Clifford Hoyle, Dr. W. A. R. Thomson, Dr. J. H. Palmer, and others including my old friend, Dr. John Grimshaw of Birkenhead. Dr. Evan Bedford has been my constant collaborator.

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ACUTE TOXÆMIA OF BURNS

EXTRACT OF SUPRARENAL CORTEX IN TREATMENT

By W. C. Wilson, M.B., F.R.C.S. Edin.*

HON. SURGEON OF THE ROYAL HOSPITAL FOR SICK CHILDREN, EDINBURGH, AND LECTURER IN APPLIED PHYSIOLOGY IN THE UNIVERSITY OF EDINBURGH

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AND

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In this paper we record what seems to us a therapeutic measure of considerable promise for the treatment of one of the very dangerous early stages in the course of an extensive burn. The report is based on results in three cases only; we make no claim therefore to an established advance in treatment. Nevertheless our observations may be considered of value since circumstances permitted a very full investigation of the course in two of the patients and thus a comparison was possible with the course in a large number of cases similarly studied under strictly comparable conditions. Our object is to bring the method to the notice of others, in order that, while further clinical and experimental tests are proceeding, it may be generally available for trial and, as seems probable, for the saving of life.

Cause of Death in Burns

A brief reference is necessary to the results of an investigation into the cause of death in burns which has been carried out by one of us (W. C. W.) and others for several years past. The full details of the investigation will be published at an early date; some results have, however, been reported in previous papers[1 2] in which will be found a description of the clinical course and of the features of acute toxæmia.

Acute toxæmia, though only an occasional occurrence under present-day treatment of burns by tannic acid, is still an important cause of death after extensive superficial burns and particularly in injuries affecting young children, in whom the clinical picture is characteristic and the illness often fulminating. The account given of the cases treated in this investigation will suffice for a description of the main symptoms and signs. It may be added that there is no characteristic change in the blood which can serve as a sure criterion of acute toxæmia and no constantly available method of assessment more accurate than observation of the signs of a failing circulation. This phase begins at any time between 6 and 50 hours after injury, and in severe cases death supervenes usually about 70 hours.

The only characteristic pathological change is severe necrosis and degeneration of the liver cells; the change is practically constant in cases which die between 50 and 100 hours, but may also be found in a proportion of those which survive for longer periods. As regards causation, it is practically certain that acute toxæmia is produced by the action of circulating toxins which have been formed by autolysis of injured tissue in the burned area. Increased concentration of the blood, early bacterial infection, and changes in blood chemistry are inconstant, and they are not essential causes of toxæmia.

The principles of treatment for most cases in the series studied were immediate coagulation of the burned area by a strong solution of tannic acid and, when necessary, maintenance of a normal blood-pressure level by intravenous infusion of gum saline. Our experience of treatment, however, includes not only various modifications of the tannic acid method but also other forms of local application; in general measures it embraces continuous as well as repeated intravenous infusions of normal saline, gum and dextrose saline, and also intravenous alkali. The point we wish to emphasise is that up to the present time, if acute toxæmia has developed in a severe or fulminating form, it has invariably proved fatal. Intravenous infusions may produce immediate but very evanescent benefit, and spontaneous improvement even for short periods of a few hours is rare.

In adults the manifestations of acute toxæmia are less prominent and less dramatic than in children. Typical features are vomiting, rise of temperature and pulse-rate, and mental changes such as anxiety, delirium, apathy, or stupor. Although death within 100 hours is the usual outcome of severe toxæmia,

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some adults survive beyond the first week only to succumb under the added load of bacterial infection, or, in certain instances when infection is very slight, as a result of severe liver damage. It is therefore more difficult in adults to forecast the outcome or to judge the value of therapy.

Clinical Report

Three cases are reported in which Eucortone, an extract of suprarenal cortex, was used as an adjuvant measure in the treatment of severe established acute toxæmia. The features specially studied were changes in the circulation, blood concentration, blood chemistry, and bacterial growth. The study was most complete in Cases 1 and 3; in Case 2 the opportunities for investigation were unavoidably restricted. It is proposed to describe only salient points of the course in each case.

CASE 1

Male, aged 3 2/12 years. Two hours before admission he was scalded by boiling water, the lesions involving about 20 per cent. of the total body surface.

Treatment.—Under nitrous oxide, oxygen, and ether anæsthesia the burned area was cleansed and 20 per cent. tannic acid and 1 per cent. gentian-violet were applied to the raw surface.

Course.—No shock was present on admission and no secondary shock developed. The first sign of toxæmia—vomiting of altered blood—appeared at 15 hours after injury. At 22 hours toxæmia became severe. The pulse-rate and rectal temperature rose rapidly; the systolic blood pressure remained unaltered but the pulse pressure decreased; there was marked restlessness combined with apathy. The skin became pallid, mottled, and cold; the lips, cheeks, and ears became ashen-grey, the eyes sunken, and the pupils dilated. In spite of reapplication of tannic acid on three occasions and intravenous infusion of gum saline at 43 hours the condition rapidly deteriorated. By 45 hours the heart-rate had reached 200 per minute and the signs of impending death were evident.

At 45 hours subcutaneous injections of eucortone were begun. After an initial injection of 0·5 c.cm., doses of 1 c.cm. were given 4-hourly. At about 30 mins. after the first injection of 1 c.cm. a distinct change was remarked. The skin had become warm, the areas of erythema around the tanned portions, previously obscured by pallor, had reappeared, the lips and ears were pink, and other signs of an active circulation in the capillaries of skin and mucous membranes were obvious. In addition the mental state of intense irritability, distress, and partial stupor had been replaced by one of quiet yet attentive restfulness. The injections were discontinued between 52 and 64 hours; the condition became again serious towards the end of the period, but improvement followed readministration of the extract which was carried on to 110 hours. By 82 hours all toxic signs and symptoms had disappeared, except that the temperature remained moderately elevated; the heart-rate had decreased to 120 per minute. There was no further recrudescence of toxæmia and the subsequent course was uneventful. The lesions were entirely healed by the thirty-fourth day.

Investigation revealed no noteworthy change in blood chemistry or blood concentration during toxæmia or subsequently during administration of eucortone. No organisms were found in cultures from the burned area up to 72 hours. A leucocyte count of 20,000 per c.mm. on admission decreased steadily to 6000 by 104 hours. The only change found in the blood after the injections of extract were begun was an increase in the sedimentation-rate (2 mm. to 27 mm.), which subsequently remained rapid.

Comment.—We have no doubt, judging from experience of similar cases, that acute toxæmia in this case would, but for the action of the extract, have proved fatal within a few hours. The beneficial effect was confirmed by withholding the extract for a period of 8 hours. The necessity for continued administration was established; here a total of 13·5 c.cm. was given, which was equivalent to 405 grammes of cortex. The course in this case suggested that formation or absorption of toxic principles from the burned area ceased at about 100 hours after injury, and showed that any damage suffered by important structures during the toxæmia had not been irreparable.

CASE 2

Female, aged 5. Thirty minutes before admission she sustained burns by fire, involving about 30 per cent. of the body surface.

Treatment.—The areas were cleansed under anæsthesia and 5 per cent. tannic acid was applied at intervals by spray.

Course.—The child remained restless in spite of sedatives. Toxæmia began at 13 hours with vomiting, which thereafter was frequent and repeated. At 15 hours the blood pressure was 60/40, the skin cold, pallid, and cyanosed, the pulse rapid and thready, the temperature raised, and delirium marked. By 24 hours the blood-pressure level had fallen so low that no accurate estimate could be made, and the condition was extremely grave.

Eucortone was injected every four hours in 0·5 c.cm. doses from 24 to 60 hours and in 1 c.cm. doses from 60 to 90 hours. No intravenous infusions were given throughout. At about one hour after the first injection the toxic manifestations began to recede and had entirely disappeared by 90 hours. Coincident with improvement in the peripheral circulation the blood pressure rose; the rise was steady and sustained. Some elevation of temperature, signs of bronchitis, and mild bacterial infection were the only abnormal features of the subsequent course.

Comment.—In this case the pronounced fall in blood pressure—an inconstant but particularly ominous event during acute toxæmia—provided a valuable additional index of the effects of therapy. Eucortone produced steady regression of well-established acute toxæmia. A total of 12 c.cm. was used, equivalent to 360 grammes of cortex.

CASE 3

Male, aged 49 years. One and a half hours before admission he sustained burns by fire which involved 25 per cent. of the body surface and in parts had penetrated deeply.

Treatment was as in Case 1. No intravenous infusion before the eleventh day.

Course.—There was no shock at 6 hours. He came under observation at 18 hours; a mild degree of secondary shock was present which passed off at 29 hours. The onset of acute toxæmia was at 32 hours; the rectal temperature and pulse-rate rose and vomiting of altered blood recurred at short intervals. At 41 hours he was cyanosed, irrational, vomiting every few minutes, and becoming exhausted by continuous hiccough. Alterations in blood chemistry were insignificant and the blood pressure remained at a normal level. There was, however, a conspicuous rise in corpuscular content of both capillary and venous blood.

Eucortone was injected in 2 c.cm. doses, at first 2-hourly, later hourly, from 41 to 87 hours and was followed by steady improvement. Vomiting stopped at 53 hours; hiccough, however, continued, though only at intervals and in milder form, till 93 hours. The pulse-rate and temperature fell; the skin developed a pink flush and the blood showed a gradual dilution. During this period a total amount was injected which was equivalent to 4020 grammes of cortex (a concentrated extract was used for part of the time).

On the eighth day signs of intoxication reappeared and again eucortone proved beneficial. On the eleventh day, when sloughs were beginning to separate in deeply burned portions, delirium, prostration, and incontinence of urine developed, which we were inclined, on the basis of previous experience, to ascribe to liver damage, although investigation yielded no evidence of this. Eucortone, injected hourly, certainly produced little obvious change at this stage and accordingly other methods were adopted.

Bacterial infection was certainly not in evidence before

the eighth day and was not gross at any subsequent time. The ultimate result was recovery.

Comment.—As already mentioned assessment of acute toxæmia is much more difficult in adults than in children. In this case, however, the degree of intoxication was such that we should not ordinarily have expected survival for more than 100 hours, and the conditions afforded a sufficiently severe test for the extract since no other measures, such as intravenous infusion, were employed to counteract a high blood concentration. The evidence of benefit from the use of the extract was clear. Events in the later stages of the course, however, suggested the question, to which an answer cannot meantime be given, whether toxic principles might injure the liver although coincidental effects on the circulatory and other mechanisms were controlled by extract therapy.

Discussion

In the three cases quoted above acute toxæmia of burns had developed in a very severe form, and, in fact, a fatal issue within a short time could have been predicted in two of them with almost complete certainty. In our experience of these conditions recovery under any methods of treatment previously employed has not occurred. With every confidence we attribute the recovery in these cases to the administration of the extract of suprarenal cortex.

In 1920 Dale [3] found that previous removal of the suprarenal glands greatly enhanced the sensitivity of cats to the toxic action of histamine. Subsequently much evidence has accumulated from animal experiment of decreased resistance to many forms of intoxication after complete ablation of the suprarenals, and, since the production of active extracts of the cortex by Swingle and Pfiffner [4] and others, it has been possible to show that the loss of resistance is probably due to deficiency of cortex; the resistance of animals after suprarenalectomy to toxic agents can be raised significantly by administration of cortical extract.[5] In man cortical extract has been employed in a few instances in the treatment of bacterial infections and toxicosis; so far as we are aware no reports are available of its use in burns.†

Regarding the mode of action of suprarenal cortex extract in combating acute toxæmia of burns we have little positive information. Our observations indicate that it results in an increased efficiency of the circulatory mechanism. The only alterations found in the blood of burned individuals during extract therapy were in the sedimentation-rate, and (once) in corpuscular content. There is no satisfactory evidence that acute toxæmia of burns produces a functional insufficiency of the suprarenal glands; changes in blood chemistry during the toxic phase of burns, though in certain instances they bear some resemblance to changes after suprarenalectomy, are irregular and frequently insignificant. Moreover, pathological studies have revealed little evidence of damage to the suprarenals; indeed we were so influenced by the absence of this evidence that we postponed the trial of the cortical extract in acute toxæmia for several years. Further investigation on the action of the extract is required, and mere speculation without basis of fact would be fruitless.

On the grounds of our limited experience of extract therapy we might venture to make tentative suggestions for treatment. Suprarenal cortical extract should be considered as an adjuvant measure, and not as a substitute for proved and recognised preventive treatment, in acute toxæmia of burns and also possibly, as future trial may show, in the stage of circulatory collapse which we call "secondary shock." We regard as essential, however, the employment of local and general measures [1 6] which have been designed especially to combat secondary shock and to minimise acute toxæmia and sepsis. In the present state of our knowledge it would be unwise to assume that exhibition of the extract will annul completely all effects of toxæmia, and therefore some precaution against liver damage is advisable. We have evidence that continuous intravenous infusion of dextrose saline from an early stage of extensive and severe burns may mitigate the injury to the liver cells. The quantities of extract required for maintenance of circulatory efficiency are evidently considerable. Of the concentrated extract now available (Allen and Hanburys Ltd.) 1 c.cm. every 2 hours from the onset of acute toxæmia will suffice for a child, while for an adult 2 c.cm. or more every hour are necessary. Injections should be continued till 100 hours after injury and should be renewed if toxic manifestations reappear. (1 c.cm. of this extract is equivalent to 75 grammes of cortex.)

† In a personal communication to one of us Mr. Harold Dodd states that he has used the extract in burns with benefit.

Case 2 was under the charge of Mr. J. C. Anderson, assistant surgeon at the Royal Hospital, Sheffield, and Case 3 under the charge of Mr. A. Pirie Watson, surgeon at the Leith Hospital. We are greatly indebted to them for permission to publish the reports. It is a particular pleasure to record our appreciation of the nursing skill in the care of burns of Nurse A. K. Smith, Royal Hospital for Sick Children, Edinburgh.

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THE EFFECT OF OÖPHORECTOMY AND SPLENECTOMY ON CANCER OF THE BREAST AND UTERUS

BY PETER PATERSON, M.B., F.R.F.P.S. Glasg.

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IT is fairly generally recognised that in cancer two factors have to be considered to explain the unlimited multiplication of the cells with secondary spread to other parts—namely, an abnormal stimulation of the cells of the parts primarily involved, and a medium in which these can grow. The latter seems to me by far the more important, and I believe that there exists a condition conducive to the onset of the disease and persisting throughout its course. If such a state were absent, either the tumour would never begin or it would remain local, because cells transferred to other parts of the body would perish in their new surroundings.

Local irritation, of a more or less trivial character, may be the exciting cause in some cases, but there are many others in which no local irritant can be found; and, on the other hand, there are individuals who have been exposed for years to a definite local irritation and yet have remained free from the disease. Innumerable investigations have been made to find

if, and what, changes take place in the tissues and metabolism of the infected person, and though many differences between the healthy and the diseased have been described, none has been recognised as being the definite underlying cause; in fact many of these may only be the result of the presence of the tumour. I am not in a position to offer an opinion as to what that change is, but I believe it does exist and further, that it may, in exceptional cases, be only temporary, since a considerable number of cases are on record in which malignant tumours have disappeared spontaneously. To these the two following may be added.

SPONTANEOUS RECOVERIES FROM SARCOMA AND CANCER

CASE 1.—Twenty-five years ago I removed a chronically inflamed appendix from a young woman. A normal convalescence followed, but a year later she again consulted me complaining of vague pains in the right iliac fossa. Palpation showed the presence of a slightly tender mass about the size of the fist in the region of the cæcum. I again operated and found a tumour involving the whole cæcum which was fixed to the iliac fossa and irremovable. A small piece was excised for microscopical examination and the wound closed. The tissue removed was submitted to the late Prof. J. H. Teacher, who reported that the tumour was a spindle-celled sarcoma. As a result of damaging the cæcal wall an abscess formed and discharging through the wound, remained open for several weeks. The only pathogenic organism found in the pus was the *Bacillus coli*. Growth was now rapid and in a few months the tumour filled the greater part of the right side of the abdomen, reaching from the liver to the pelvis; it extended almost to the middle line in front, and halfway down the thigh. At this stage the patient's condition was very poor and there was much emaciation. Then, for no obvious reason, the mass began to shrink, and it continued to do so till it disappeared. To-day the patient is alive and well.

CASE 2.—The second patient is a woman on whom, 18 years ago, I performed a laparotomy for a carcinoma of the stomach. As there were secondary nodules in the liver, nothing further was done except to close the abdominal wound, and yet this patient is to-day apparently quite well. The diagnosis in this case was also confirmed by microscopical examination of a gland removed at the operation.

In these cases either the tumour cells stopped growing because of some change in the cells themselves; or the resistance of the tissues had been so raised, either by addition or subtraction, they were able to overcome the abnormal growth.

OÖPHORECTOMY AND SPLENECTOMY

Recently attention has been directed to the endocrine glands as possibly having some influence on the onset and course of these tumours. Before the important place that endocrines take in metabolism was appreciated, the late Sir George Beatson held the opinion that the ovaries took some part in the ætiology and course of this class of tumour, and recent investigations seem to support his contention. Acting in that belief, he performed a double oöphorectomy on two patients suffering from cancer, but without arresting the course of the disease.

The high degree of immunity presented by the spleen to cancer, either primary or secondary, has not escaped the notice of those who have been trying to find something that would have a beneficial influence on the course of the disease once it had become established and many attempts, in which I have shared, have been made to control its progress by injections of various forms of splenic extract. The extract I used was prepared for me by Dr. D. P. Cuthbertson, late of the biochemical department of the Glasgow Royal Infirmary, by a method similar to that employed in the preparation of insulin. The conclusion I came to as a result of these injections was that growth was stimulated, and the larger the dose, the more rapidly did it advance. If these observations were correct, the question now arose, would removal of the spleen have any influence on the disease? I resolved to try, if a suitable case presented itself.

CASE 3.—In May, 1931, a woman, aged 41, came under my care in the Royal Infirmary who, two years previously, had had her uterus and both ovaries removed for an adenocarcinoma of the uterus. When I saw her she had a tumour in the pelvis which had invaded the rectum on the one side and the bladder on the other. There was a discharge of blood, pus, and mucus from the rectum with considerable pain during defæcation. Micturition was frequent, about once every two hours, and was painful. The urine contained pus and blood, the latter quite visible to the eye. Rectal palpation revealed a fixed ulcerating mass in the anterior wall of the rectum. Cystoscopic examination showed a large irregular ulcerating tumour towards the base of the bladder with phosphatic deposits scattered over the surface of the growth. Pain was so severe she required narcotics to get sleep and secondary anæmia was well marked.

A left inguinal colostomy was performed and at the same time the spleen was removed. Intra-abdominal palpation revealed an extensive glandular infection. Six weeks later she was given daily injections of fairly large doses (4 c.cm.) of splenic extract. These injections were continued for six weeks. At the end of that time the condition was worse. The rectal ulcer was larger; the blood in the urine was sufficient to make it blood-red and her appetite had almost disappeared. The dose of extract was then reduced to 1 c.cm. daily and continued for two months. At the end of that time she began to improve; rectal pain was less and blood in the urine could only be found by reagents. She could sleep without narcotics; appetite was better and she began to gain weight. Improvement was slow but steady till at the end of a year no trace of the disease could be found in the rectum, pelvis, or bladder, a cystoscopic examination of which showed a smooth whitish patch where the tumour had been situated. I still see her occasionally, and at present, nearly four years after the disappearance of the disease, there is no evidence of a recurrence; she feels quite well and has gained 3 st. in weight.

Subsequently, splenectomy was performed in several patients who were suffering from inoperable cancer. A few of these had no other treatment; others were exposed to deep X ray therapy, whilst others had injections of splenic extract in various doses; but in all of them the disease ran its course, so that evidently the result obtained in the first case was not due to splenectomy alone. In nearly every one of these cases the spleen was more or less adherent to some of the surrounding structures, probably as the result of perisplenitis, though nothing abnormal could be found in the spleen itself on microscopical examination.

It was next decided to remove both ovaries and spleen in a patient who had an inoperable carcinoma, if such could be found who would consent to the operation.

CASE 4.—In July, 1935, a woman, aged 46, presented herself at the Infirmary with a cancer of the right breast which she had known to be present for at least a year. She was emaciated and her appetite was only fair; she had very little pain. The breast, which was not large, was infiltrated with a hard nodular mass and was firmly fixed to the chest wall. A chain of enlarged glands, each about the size of a cherry, extended along the anterior axillary wall into the apex of the axilla, and there were several hard red nodules in the skin over the breast and also in the skin of the chest wall in the immediate neighbourhood, showing a widespread lymphatic involvement.

After explaining to her what the double operation meant, and having obtained her consent, I removed the spleen and both ovaries on July 24th, and also one of the glands for examination. The pathologist reported that the gland was infiltrated with adenocarcinoma. Apart from the removal of spleen and ovaries no other treatment has been given. The disease appeared to remain stationary for about four months and then commenced to improve. When I last saw her at the middle of May—i.e., about ten months after operation—the enlarged axillary glands were no longer palpable, the cutaneous nodules had all disappeared, and the breast was a shrivelled fibrous mass. There was in fact no sign of active disease, and the patient had gained a stone in weight.

I can offer no explanation as to what metabolic changes take place as a result of double oöphorectomy with splenectomy; that belongs to the province of the biochemist and physiologist. But apparently the removal of either ovaries or spleen does not influence the course of the cancer, nor does removal of the spleen alone make patients immune from it. McNee, for example, mentions two cases in which cancer of the buccal cavity has appeared three years after splenectomy.[1]

It is known that after removal of the spleen its functions, so far as they are related to the cellular elements of the blood, are taken up by other structures, especially the bone-marrow, and it is thought to take some part in preventing septic infection; but beyond that we are ignorant. Even its structure is a subject in which there are differences of opinion. Like the other ductless glands, it may secrete a hormone, but if such does exist, it is probably of minor importance in the general metabolism, since its removal does not prevent good health; but the same is true of the ovary, which undoubtedly has an internal secretion. Perhaps there is an inter-relationship between the two glands, or they may act on other endocrines through that distributing centre, the pituitary.

The cases here submitted are far too few to serve as basis for general conclusions; and from circumstances beyond my control I am no longer in a position to continue the investigation. But few though they are, they may possibly serve as a guide to other workers in this field.

COUNTER-IRRITATION BY ULTRA-VIOLET LIGHT

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Counter-irritation is an ancient method of therapy. Discovery in chemistry or physics has evolved many new methods; innumerable chemical reagents are now recognised for their action as rubefacients or vesicants. Physical agents producing heat, electricity, or friction are also used.

The ultra-violet rays that cause erythema of the skin can be successfully employed for counter-irritation. Wave-lengths shorter than 3000 Angstrom units applied to the normal white skin cause erythema after a latent period of 4–6 hours. The dosage and technique of irradiation controls the degree of skin reaction that results. This can be varied so as to cause a mild erythema or a definite or severe blistering of the skin. Ultra-violet irradiation is therefore excellent for counter-irritation, as the rays can be directly applied to any area and the degree of reaction can be accurately defined and controlled. With the chemical and other counter-irritants, this is not always possible in practice; the strength of drugs such as mustard is difficult to regulate and often their application has to be repeated until the desired skin reaction is obtained.

[1] McNee, J. W.: The Lancet, 1931, i., 1011.

THE REACTION

The classical pharmacological studies of the action of irritant agents on the skin describe general, local, and special reflex effects on the body. Naturally the severity of the reaction varies with the strength of the irritant applied.

The general effect of counter-irritants follows immediately; stimulation of the sensory nerves causes mild contraction of the blood-vessels in the splanchnic area, with rise of blood pressure, accentuation of heart-beat and of respiration. The sudden application of a severe irritant may cause sufficient damage to produce the signs and symptoms of surgical shock with fatal collapse.

The local effect may be a mild redness of the skin due to dilatation of blood-vessels at the site of application; a sensation of warmth and anæsthesia is felt. The exudation of plasma and lymph and transudation of fluid through the skin tissues causes signs of œdema, blistering, or even pustulation and necrosis, with symptoms of local discomfort, pain, and irritation.

The special reflex reaction is still a problem of much interest and recognised importance. Little progress has been made since the days of Head and Mackenzie. Reflex stimulation of viscera by trophic nerves, far remote from the site of application of irritant but connected by nervous channels, may explain many of those intricate cases that have successful and immediate relief from pain. At times counter-irritation to an area of skin clears up mysteries of what lies in the remote depths of the body. This is constantly observed, but the therapeutic action is still unexplained.

Skin erythema appears about 4 hours after ultra-violet irradiation; a maximum reaction results about 48 hours later and this erythema may persist for 3 or even up to 12 days, with intensive dosage. With still increased intensity of radiation, œdema and blistering are produced; this effect may be obtained by increasing the strength of the ultra-violet rays emitted by the source of light, by diminishing the distance between the skin and the source of rays, or by increasing the length of exposure. The dose of rays can be accurately determined and expressed in terms of skin erythema doses; usually from 6–10 skin erythema doses are applied for counter-irritation therapy. Following the erythema, œdema, and blistering of the skin, there is drying and desquamation. Pigmentation finally results. The dilatation of the skin capillaries in an area of irradiated skin persists for many months; this phenomenon can be clearly demonstrated, for if 1 c.cm. of histamine phosphate solution, containing 0·003 g. of histamine base is injected subcutaneously an intense erythematous blush appears 10–15 mins. later in the irradiated skin; the surrounding area does not show any visible change.

The erythema and blistering reaction of the irradiated skin is painful and uncomfortable. This is a very serious complication, for the symptoms are often so severe and unpleasant that the patient becomes greatly distressed and has to go to bed.

Special dressings for the blistered skin area and sedative medicines are necessary. Fortunately this painful reaction can be checked and at times successfully avoided. Directly after irradiation, adhesive Elastoplast strapping is applied to the irradiated skin and the surrounding area. This greatly diminishes the painful symptoms, but in no way alters the reaction. The strapping is kept on and left undisturbed for 14 days; it is then removed and the irradiated skin is exposed, revealing a reddish-brown moist area. Pigmentation varying in colour from a pale to a dark brown will finally develop. The relief of the painful symptoms obtained by the application of strapping is indeed most remarkable, for by this means it is possible to apply 10–12 times the normal skin erythema dose of ultra-violet rays to an area of normal white skin without unduly disturbing the patient. Intensive erythema, œdema, and exudation must develop in the protected skin area. The strapping remains comfortably in position and when it is removed 14 days later the desquamated skin is shed simultaneously. It is necessary to explain emphatically to the patient that the strapping must not be disturbed for 14 days. If this skin area is still painful, infra-red rays can be applied, two or three times a week, to this region, the strapping being left undisturbed.

METHOD OF APPLICATION

The area of skin selected for ultra-violet irradiation is mapped out carefully with a dermatograph pencil. The time and distance factors of dosage are also indicated by writing on the skin, so that accurate information will be directly available at the time of treatment. The surrounding skin area is protected from the rays of the lamp by a covering of pieces of crêpe paper attached by strips of adhesive plaster or strapping. Towels or other simple means of protection may be employed. The irradiated area is accurately exposed according to the prescribed formula. Usually a skin area measuring roughly 12 by 10 in. is exposed. A quartz air-cooled mercury-vapour lamp operated by a current of 2·5 amperes and 140 volts between the electrodes is switched on. At a distance of 12 in. between the quartz burner and the skin area, an exposure for 20 mins., equivalent to ten normal erythema skin doses, is applied. This irradiated skin area and the surrounding skin margin extending for 1–2 in. is immediately covered by overlapping strips of adhesive plaster 2–2½ in. in width. The dermatograph pencil marks are removed. The patient is instructed to leave this plaster undisturbed for 14 days. During this period it may be necessary to report for further consultation or for further treatment such as the application of infra-red rays 2–3 times a week. If infra-red and luminous irradiation are necessary the rays are applied to the selected area but the strapping is not disturbed.

Some patients complain of some discomfort during the second or third day, others complain of itching of the skin on the seventh to ninth day. Usually these symptoms are of no serious consequence and do not necessitate any special interference or local treatment. Two weeks following treatment the strips of strapping are removed, the skin area is cleansed with methylated ether or oil of eucalyptus. A moist red or a pigmented yellow-red area of skin is seen. Skin desquamation and a full exudative reaction has occurred beneath the plaster quite unknown to the patient. Further infra-red irradiation may be applied to this area, but local ultra-violet irradiation is contra-indicated as the area will be highly resistant and immune to a further erythema reaction for some weeks. In hospital practice patients receiving local intensive ultra-violet irradiation are usually made to report seven days after treatment. If symptoms are present or the site of pain has now altered in its position, a further treatment to a new skin area may be prescribed.

INDICATIONS

The types of cases selected for treatment by this technique of intensive ultra-violet irradiation were those in which symptoms of acute pain were present (brachial and sciatic neuritis, lumbago, fibrositis, &c.); those in whom there was swelling of joints due to effusion of fluid; those with symptoms of asthma, with dyspnœa, and a definite history of frequent attacks of troublesome respiration.

Acute pain.—Painful symptoms due to cervical fibrositis, brachial neuritis, lumbar fibrositis, lumbago and sciatic neuritis were treated. Early cases with symptoms of sudden onset of acute pain and signs of rigidity and limited movement rarely visit the out-patient departments of hospitals and clinics. Usually they first consult local practitioners and are put to rest in bed and given medicinal treatment. Symptoms may completely subside within 5–7 days. It is difficult to assess the value of treatment in this one group, for though signs and symptoms clear up rapidly after local ultra-violet counter-irritation treatment and the success is attributed to the treatment many of these acute attacks of muscle and nerve inflammations may possibly clear up independent of treatment.

The cases in which the symptoms persist are the type commonly seen in hospitals. Those patients, who complain of pain in neck radiating to the shoulder and arm, were treated by the application of the rays of the air-cooled quartz mercury-vapour lamp, to an area of skin over the cervical area passing to the shoulder and arm. At a distance of 12 in. from the source of light the skin was irradiated for 20 mins. This was immediately covered with strips of elastoplast strapping. Infra-red rays were also applied three times a week to this area. Two weeks later the elastoplast strapping was removed and the area of red-brown coloured moist skin was exposed. As a rule pain was quickly relieved and the movements of shoulder were free or greatly improved. It was sometimes necessary that the infra-red irradiation should be continued three times a week for a further fortnight. At times patients stated that the symptoms in the shoulder had disappeared, but pain in arm or forearm was present. In these cases, intensive irradiation was applied to another skin area corresponding to the site of pain.

Lumbar pain was similarly treated but the painful and tender skin area of the back indicated by the patient was irradiated. Usually the size of the area was 10 by 12 in. In the successful cases relief of symptoms was reported after the first treatment.

Sciatic neuritis was treated by irradiation of the skin over the buttock and the skin of the back of the thigh. The results were satisfactory in about 60–70 per cent. of cases. In general, early cases in which symptoms were of a shorter duration responded most favourably. Local infra-red irradiation was always prescribed. At times the position of pain changed and was referred to the calf and outer side of the foot. Ultra-violet irradiation was never repeated over the same area of skin, but a new skin area over the back of the thigh or the calf was selected for further treatment after an interval of 14 days. Severe chronic sciatic neuritis of long duration with signs of muscle wasting and partial nerve paralysis needed longer treatment, with continued infra-red irradiation twice a week for 6–8 weeks. The counter-irritation always helped to relieve the acute painful symptoms.

Swollen joints.—Intensive local ultra-violet irradiation of the skin over swollen joints will at times reduce the degree of swelling and allow freer movement. Unhappily chronic and subacute infective arthritis does not respond as well or as consistently as traumatic arthritis. Naturally the most favourable cases are those following recent injury in which there is subacute synovitis with fluid

effusion. The conditions of monarticular arthritis deserve perseverance with this therapy. Ultra-violet irradiation hastens the absorption of fluid and resolution of inflammation.

Asthma.—It is very surprising to be able to record favourable results in isolated cases of chronic asthma. The patients selected at the clinic for this treatment were those who definitely expressed the severity of their symptoms. Long-standing asthma with signs of bronchitis and emphysema, giving a history of symptoms of urgent dyspnœa, was at times greatly relieved. All cases were treated by the same method. An intensive local application of ultra-violet rays was applied to an area (10 by 12 in.) of the skin of the back of the chest. The patients who responded favourably within the following 7–14 days and who stated that their symptoms were relieved were given a second treatment to the skin of the front of the chest. During the first 2–3 days following treatment coughing was more frequent and expectoration freer and more copious; dyspnœa was diminished and respiration improved. Clinically these patients have signs of chronic bronchitis and emphysema and therefore the value of treatment can only be assessed by the remarks of the patient, but these were favourable.

CONCLUSIONS

No argument or theory explaining these results will be expressed; a definite maximum counter-irritation reaction of the skin has been established by means of ultra-violet irradiation. The painful symptoms and discomfort usually following such measures have been greatly lessened by the immediate application of elastoplast strapping over and beyond the irradiated skin area. Total or partial relief of symptoms often follows treatment. The value of counter-irritation has already been well established, but the use of ultra-violet rays for this purpose affords a new and practical method of application, for any desired area of skin can be selected and the degree of skin reaction can be completely controlled at will.

CHEMICAL CHANGES IN THE BLOOD IN ADDISON'S DISEASE

AND THEIR ALTERATION IN RESPONSE TO TREATMENT

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RECENT developments in the treatment of Addison's disease date from 1926, when Baumann and Kurland [1] studied the effect of adrenalectomy on the electrolyte pattern of the blood in cats and rabbits, and Marine and Baumann [2] showed that the life of the adrenalectomised animals could be prolonged by the administration of sodium chloride. The first application of these results to human cases of Addison's disease was published by Loeb [3] in 1932.

Meanwhile, in 1930, Swingle and Pfiffner [4] had isolated a hormone from suprarenal cortex which was active in relieving symptoms of suprarenal insufficiency: numerous publications have confirmed the value of this in cases of experimental adrenal insufficiency, and in Addison's disease, though the exact position as regards its proper employment is at present not clear. Harrop, Weinstein, Soffer, and Trescher [5] state that cortical extract has no definite effect on hypotension or pigmentation and are not convinced that it has any effect on nutrition and weight. They stress that its principal importance is in the treatment of relapse. Snell [6] also states that in the chronic phase of the disease no striking clinical effect is to be expected from the administration of cortical extract, and Rogoff [7] found that Eschatin was of no value in restoring suprarenalectomised cats, and suggests that improvements caused by its administration are due to the water and salt given along with it. Kendall [8] has separated two active fractions from an adrenal cortex extract, one of which produced results only when salt was given with it.

It seems therefore desirable at present that every opportunity should be taken to study cases of Addison's disease as fully as possible, and the following paper gives the results of the chemical findings in eight cases of Addison's disease. The patients were scattered in various hospitals, and it has not been possible to carry out the investigations in every case as fully and systematically as one would wish.

BLOOD CHEMICAL CHANGES IN SUPRARENAL INSUFFICIE[illegible]

The characteristic bloo[illegible]l suprarenal insufficiency [illegible] and chlorine content [illegible] potassium and magn[illegible] (high blood-urea [illegible] increased concentra[illegible] capacity and hæm[illegible] protein). These fin[illegible] and cats [1] and do[illegible] and Leland [9]) but [illegible] Korenchevsky [10] fou[illegible] adrenalectomised rats.

In untreated cases o[illegible] very similar to the above [illegible]d, Harrop, and others, though [illegible] during the chronic or stationary period [illegible] disease the composition of the blood and electrolyte pattern

TABLE I

In this table and Table II. the figures without parentheses indicate mg. per 100 c.cm. serum, except for HCO_3 (vols. per cent.) and total protein (g. per 100 c.cm.); figures in parentheses indicate milli-equivalents per litre of serum. (Values for protein calculated from sum of albumin and globulin, not shown in tables.)

FINDINGS ON ADMISSION

Case.	Na.	K.	Cl.	Blood-urea.
Normal values	320 (139)	20 (5·0)	355 (100)	30
1	277 (120)	40·0 (10·0)	316 (89)	57*
2	283 (123)	26·0 (6·5)	330 (93)	76
3	255 (111)	22·5 (5·8)	308 (86·6)	46
4	251 (109)	23·5 (6·0)	294 (82·7)	56
5	295 (128·5)	24·8 (6·4)	354 (99·9)	77
6	262 (114)	21·7 (5·5)	305 (86)	60
7	266 (116)	35·6 (9·1)	295 (83)	160
8	265 (115·5)	21·3 (5·5)	—	60
FINDINGS IN CRISIS				
3	244 (106)	31·2 (8·0)	—	91
4	219 (95·5)	28·0 (7·2)	235 (66·2)	44†

* Non-protein nitrogen.

† This value was so surprising that it was checked twice, with the same result.

are within normal limits. The rise in blood-urea seems the least constant of these changes. Levy Simpson [11] found blood-urea normal in 2 cases out of 6 and Rowntree [12] found it above 50 mg. per 100 c.cm. in only 4 out of 12 cases. In crisis the blood-urea is more constantly high, though even here there are exceptions (see Case 4). It has been possible to restore the blood composition of human sufferers

approximately to normal figures in many cases by treatment with sodium salts with or without cortical extract.

Of the cases described in this paper all showed to a greater or less extent these changes on first observation, as shown in Table I. Two of the patients went into crisis (Cases 3 and 4) while under observation, and the abnormality already present was greatly exaggerated under these circumstances; in crisis there is frequently a marked rise in the non-protein nitrogen, but in Case 4, which was fatal, the blood-urea actually fell.‡ Of the eight cases described in this paper, four (Nos. 1, 3, 5, and 6) were improved sufficiently to leave hospital; one (No. 4) died in crisis; one (No. 2) died on cessation of treatment with cortical extract; and two (Nos. 7 and 8) were not diagnosed with certainty before death, though in both cases the blood pressure and chemical findings made the diagnosis of adrenal insufficiency a very probable one. Of the four discharged one (No. 1) is untraced, two (Nos. 3 and 5) died a month after discharge, and one (No. 6) is still alive.

CASE REPORTS

CASE 1.—A man aged 36, a painter, was admitted to Charing Cross Hospital on Oct. 3rd, 1934, complaining of loss of appetite and languidness with vague onset in November, 1933, and becoming worse till June, 1934. There was nausea, but no vomiting; anorexia; never any diarrhœa. Pigmentation noticed in April, 1934, and got worse till July when he became "as black as a penny," then gradually better, more rapidly under treatment. Weight: 1933, 8 st. 7 lb.; June, 1934, 7 st. 2 lb.; October, 1934, 6 st. 7 lb.

Examination.—Generally dark; small areas of pigmentation on face, trunk, flexures and pressure points, and inside of mouth. Hand-grip weak; blood pressure, 86/65; otherwise normal. Radiography: no evidence of tuberculosis of lungs; no suprarenal shadows.

Progress.—While in hospital the patient continued to improve, irrespective of what treatment was given, and he was discharged feeling nearly fit for work on Nov. 20th, with instructions to continue with 10 grammes of salt daily. Subsequent efforts to trace him have failed.§

Blood pressure.—Varied between 70/50 and 95/60, but there was no sign of any alteration in response to cortical extract or salt.

Chemical findings (Table II.).—The serum sodium and chlorine remained low throughout, and showed no significant alteration, in spite of clinical improvement.

CASE 2.—A woman aged 51, in domestic work, was admitted to Hackney Hospital on Jan. 4th, 1935, complaining of headache, nausea, sickness, and pigmentation for a year; weakness for three weeks. She had been subject to attacks of headache and sickness all her life: these were worse during the last year. Pigmentation was noticed one year ago. No loss of weight noticed. Tired during last three weeks: extremely fatigued for last fortnight.

Examination.—Drowsy, retching, sweating. Uniform pigmentation of skin and mucosa of mouth; weak. Blood pressure 88/65. Arthritis of both knees. No other physical signs of disease. No radiographic evidence of tuberculosis; no definite suprarenal shadows.

Progress.—Treatment with Eucortone started on Jan. 21st: the patient was exceedingly weak before, but rapidly felt stronger and brighter under treatment. There was pyrexia up to 103° the day after the treatment began, but after this the temperature remained normal, with occasional rises to 99°, till the beginning of March, when diarrhœa commenced with pyrexia; these symptoms persisted till shortly before death, but no pathogenic organisms could be found as a cause. Blood pressure varied over a wide range, but there seemed a definite rise of systolic pressure under cortical extract (Fig. 1). Treatment with salt was attempted from Feb. 21st, but the patient failed to keep all the salt down when given by mouth, and could not retain rectal saline; so the amount of salt was never really the full 15 g. per day. The improvement in the clinical condition under cortical extract was definite, but it was not considered justifiable on the grounds of expense to go on with 30 c.cm. of cortical extract daily, and cortical extract was stopped on March 28th. The patient slowly sank and died on April 12th. Permission could not be obtained for a post-mortem examination.

Chemical findings (Table II. and Fig. 1).—Under the enormous doses of cortical extract used there was very

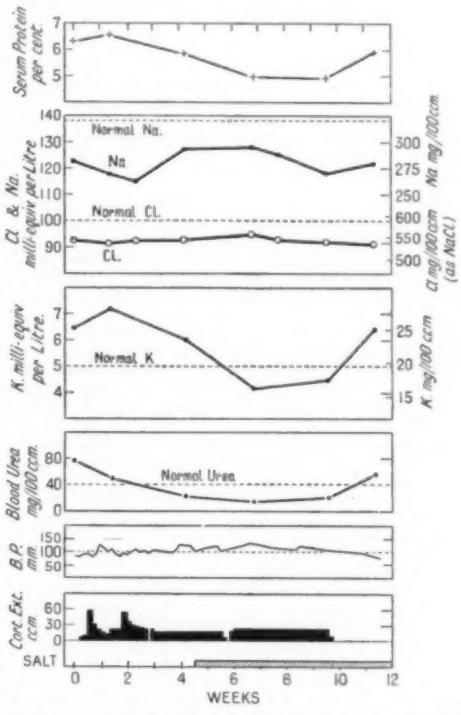

FIG. 1 (Case 2).—To show blood dilution and fall in potassium and urea with little change in sodium and chlorine in spite of massive doses of cortical extract. Note the rise in potassium, urea, and protein when cortical extract is omitted.

little tendency for the sodium and chlorine to return to normal. There was, however, evidence of retention of fluid in the blood shown by fall in plasma proteins from 6·55 to 4·96 per cent. under treatment: on cessation of administration of cortical extract, the potassium and urea rose again to pathological values, and plasma proteins rose to 5·9 per cent., indicating a loss of fluid from the blood.

CASE 3.—A woman aged 43, a housewife, was admitted to Charing Cross Hospital on March 30th, 1935, complaining of being run down since the shock of an accident to her son 18 months previously. Five weeks before admission she had diarrhœa and since then she had suffered from "wasting and anæmia."

Examination.—Poor condition. General pigmentation, most marked over pressure points, and pigmentation of mucous membrane of mouth. Blood pressure: 100/? as out-patient but 70/50 on admission to ward.

Progress.—From admission to April 30th she was treated with 5 c.cm. eschatin twice weekly, with some improvement, but on April 30th she rapidly sank and became drowsy and sick and lost her appetite, and the

‡ In Loeb, Atchley, Gutman, and Jillson's case[19] the non-protein nitrogen fell when the patient went into crisis.

§ The Registrar-General has kindly informed me that no record of this patient's death has been registered up to June 30th, 1935.

effusion. The conditions of monarticular arthritis deserve perseverance with this therapy. Ultra-violet irradiation hastens the absorption of fluid and resolution of inflammation.

Asthma.—It is very surprising to be able to record favourable results in isolated cases of chronic asthma. The patients selected at the clinic for this treatment were those who definitely expressed the severity of their symptoms. Long-standing asthma with signs of bronchitis and emphysema, giving a history of symptoms of urgent dyspnœa, was at times greatly relieved. All cases were treated by the same method. An intensive local application of ultra-violet rays was applied to an area (10 by 12 in.) of the skin of the back of the chest. The patients who responded favourably within the following 7–14 days and who stated that their symptoms were relieved were given a second treatment to the skin of the front of the chest. During the first 2–3 days following treatment coughing was more frequent and expectoration freer and more copious; dyspnœa was diminished and respiration improved. Clinically these patients have signs of chronic bronchitis and emphysema and therefore the value of treatment can only be assessed by the remarks of the patient, but these were favourable.

CONCLUSIONS

No argument or theory explaining these results will be expressed; a definite maximum counter-irritation reaction of the skin has been established by means of ultra-violet irradiation. The painful symptoms and discomfort usually following such measures have been greatly lessened by the immediate application of elastoplast strapping over and beyond the irradiated skin area. Total or partial relief of symptoms often follows treatment. The value of counter-irritation has already been well established, but the use of ultra-violet rays for this purpose affords a new and practical method of application, for any desired area of skin can be selected and the degree of skin reaction can be completely controlled at will.

CHEMICAL CHANGES IN THE BLOOD IN ADDISON'S DISEASE

AND THEIR ALTERATION IN RESPONSE TO TREATMENT

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RECENT developments in the treatment of Addison's disease date from 1926, when Baumann and Kurland [1] studied the effect of adrenalectomy on the electrolyte pattern of the blood in cats and rabbits, and Marine and Baumann [2] showed that the life of the adrenalectomised animals could be prolonged by the administration of sodium chloride. The first application of these results to human cases of Addison's disease was published by Loeb [3] in 1932.

Meanwhile, in 1930, Swingle and Pfiffner [4] had isolated a hormone from suprarenal cortex which was active in relieving symptoms of suprarenal insufficiency: numerous publications have confirmed the value of this in cases of experimental adrenal insufficiency, and in Addison's disease, though the exact position as regards its proper employment is at present not clear. Harrop, Weinstein, Soffer, and Trescher [5] state that cortical extract has no definite effect on hypotension or pigmentation and are not convinced that it has any effect on nutrition and weight. They stress that its principal importance is in the treatment of relapse. Snell [6] also states that in the chronic phase of the disease no striking clinical effect is to be expected from the administration of cortical extract, and Rogoff [7] found that Eschatin was of no value in restoring suprarenalectomised cats, and suggests that improvements caused by its administration are due to the water and salt given along with it. Kendall [8] has separated two active fractions from an adrenal cortex extract, one of which produced results only when salt was given with it.

It seems therefore desirable at present that every opportunity should be taken to study cases of Addison's disease as fully as possible, and the following paper gives the results of the chemical findings in eight cases of Addison's disease. The patients were scattered in various hospitals, and it has not been possible to carry out the investigations in every case as fully and systematically as one would wish.

BLOOD CHEMICAL CHANGES IN SUPRARENAL INSUFFICIENCY

The characteristic blood changes in experimental suprarenal insufficiency consist of a fall in the sodium and chlorine content of the serum, a rise in the potassium and magnesium, a retention of nitrogen (high blood-urea and non-protein nitrogen), and increased concentration of the blood (high oxygen capacity and hæmatocrit values and high serum protein). These findings have been noted in rabbits and cats [1] and dogs (Loeb, Atchley, Benedict, and Leland [9]) but Levy Simpson, Dennison, and Korenchevsky [10] found serum chlorine normal in adrenalectomised rats.

In untreated cases of Addison's disease changes very similar to the above have been noted by Loeb, Harrop, and others, though Snell [6] states that during the chronic or stationary period of the disease the composition of the blood and electrolyte pattern are within normal limits. The rise in blood-urea seems the least constant of these changes. Levy Simpson [11] found blood-urea normal in 2 cases out of 6 and Rowntree [12] found it above 50 mg. per 100 c.cm. in only 4 out of 12 cases. In crisis the blood-urea is more constantly high, though even here there are exceptions (see Case 4). It has been possible to restore the blood composition of human sufferers

TABLE I

In this table and Table II. the figures without parentheses indicate mg. per 100 c.cm. serum, except for HCO_3 (vols. per cent.) and total protein (g. per 100 c.cm.); figures in parentheses indicate milli-equivalents per litre of serum. (Values for protein calculated from sum of albumin and globulin, not shown in tables.)

FINDINGS ON ADMISSION

Case.	Na.	K.	Cl.	Blood-urea.
Normal values	320 (139)	20 (5·0)	355 (100)	30
1	277 (120)	40·0 (10·0)	316 (89)	57*
2	283 (123)	26·0 (6·5)	330 (93)	76
3	255 (111)	22·5 (5·8)	308 (86·6)	46
4	251 (109)	23·5 (6·0)	294 (82·7)	56
5	295 (128·5)	24·8 (6·4)	354 (99·9)	77
6	262 (114)	21·7 (5·5)	305 (86)	60
7	266 (116)	35·6 (9·1)	295 (83)	160
8	265 (115·5)	21·3 (5·5)	—	60

FINDINGS IN CRISIS

3	244 (106)	31·2 (8·0)	—	91
4	219 (95·5)	28·0 (7·2)	235 (66·2)	44†

* Non-protein nitrogen.

† This value was so surprising that it was checked twice, with the same result.

approximately to normal figures in many cases by treatment with sodium salts with or without cortical extract.

Of the cases described in this paper all showed to a greater or less extent these changes on first observation, as shown in Table I. Two of the patients went into crisis (Cases 3 and 4) while under observation, and the abnormality already present was greatly exaggerated under these circumstances; in crisis there is frequently a marked rise in the non-protein nitrogen, but in Case 4, which was fatal, the blood-urea actually fell.‡ Of the eight cases described in this paper, four (Nos. 1, 3, 5, and 6) were improved sufficiently to leave hospital; one (No. 4) died in crisis; one (No. 2) died on cessation of treatment with cortical extract; and two (Nos. 7 and 8) were not diagnosed with certainty before death, though in both cases the blood pressure and chemical findings made the diagnosis of adrenal insufficiency a very probable one. Of the four discharged one (No. 1) is untraced, two (Nos. 3 and 5) died a month after discharge, and one (No. 6) is still alive.

CASE REPORTS

CASE 1.—A man aged 36, a painter, was admitted to Charing Cross Hospital on Oct. 3rd, 1934, complaining of loss of appetite and languidness with vague onset in November, 1933, and becoming worse till June, 1934. There was nausea, but no vomiting; anorexia; never any diarrhœa. Pigmentation noticed in April, 1934, and got worse till July when he became "as black as a penny," then gradually better, more rapidly under treatment. Weight: 1933, 8 st. 7 lb.; June, 1934, 7 st. 2 lb.; October, 1934, 6 st. 7 lb.

Examination.—Generally dark; small areas of pigmentation on face, trunk, flexures and pressure points, and inside of mouth. Hand-grip weak; blood pressure, 86/65; otherwise normal. Radiography: no evidence of tuberculosis of lungs; no suprarenal shadows.

Progress.—While in hospital the patient continued to improve, irrespective of what treatment was given, and he was discharged feeling nearly fit for work on Nov. 20th, with instructions to continue with 10 grammes of salt daily. Subsequent efforts to trace him have failed.§

Blood pressure.—Varied between 70/50 and 95/60, but there was no sign of any alteration in response to cortical extract or salt.

Chemical findings (Table II.).—The serum sodium and chlorine remained low throughout, and showed no significant alteration, in spite of clinical improvement.

CASE 2.—A woman aged 51, in domestic work, was admitted to Hackney Hospital on Jan. 4th, 1935, complaining of headache, nausea, sickness, and pigmentation for a year; weakness for three weeks. She had been subject to attacks of headache and sickness all her life: these were worse during the last year. Pigmentation was noticed one year ago. No loss of weight noticed. Tired during last three weeks: extremely fatigued for last fortnight.

Examination.—Drowsy, retching, sweating. Uniform pigmentation of skin and mucosa of mouth; weak. Blood pressure 88/65. Arthritis of both knees. No other physical signs of disease. No radiographic evidence of tuberculosis; no definite suprarenal shadows.

Progress.—Treatment with Eucortone started on Jan. 21st: the patient was exceedingly weak before, but rapidly felt stronger and brighter under treatment. There was pyrexia up to 103° the day after the treatment began, but after this the temperature remained normal, with occasional rises to 99°, till the beginning of March, when diarrhœa commenced with pyrexia; these symptoms persisted till shortly before death, but no pathogenic organisms could be found as a cause. Blood pressure varied over a wide range, but there seemed a definite rise of systolic pressure under cortical extract (Fig. 1). Treatment with salt was attempted from Feb. 21st, but the patient failed to keep all the salt down when given by mouth, and could not retain rectal saline; so the amount of salt was never really the full 15 g. per day. The improvement in the clinical condition under cortical extract was definite, but it was not considered justifiable on the grounds of expense to go on with 30 c.cm. of cortical extract daily, and cortical extract was stopped on March 28th. The patient slowly sank and died on April 12th. Permission could not be obtained for a post-mortem examination.

Chemical findings (Table II. and Fig. 1).—Under the enormous doses of cortical extract used there was very

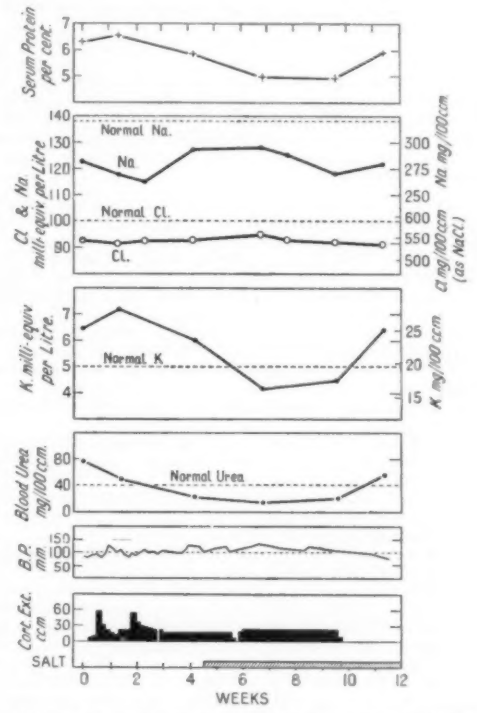

FIG. 1 (Case 2).—To show blood dilution and fall in potassium and urea with little change in sodium and chlorine in spite of massive doses of cortical extract. Note the rise in potassium, urea, and protein when cortical extract is omitted.

little tendency for the sodium and chlorine to return to normal. There was, however, evidence of retention of fluid in the blood shown by fall in plasma proteins from 6·55 to 4·96 per cent. under treatment: on cessation of administration of cortical extract, the potassium and urea rose again to pathological values, and plasma proteins rose to 5·9 per cent., indicating a loss of fluid from the blood.

CASE 3.—A woman aged 43, a housewife, was admitted to Charing Cross Hospital on March 30th, 1935, complaining of being run down since the shock of an accident to her son 18 months previously. Five weeks before admission she had diarrhœa and since then she had suffered from "wasting and anæmia."

Examination.—Poor condition. General pigmentation, most marked over pressure points, and pigmentation of mucous membrane of mouth. Blood pressure: 100/? as out-patient but 70/50 on admission to ward.

Progress.—From admission to April 30th she was treated with 5 c.cm. eschatin twice weekly, with some improvement, but on April 30th she rapidly sank and became drowsy and sick and lost her appetite, and the

‡ In Loeb, Atchley, Gutman, and Jillson's case [13] the non-protein nitrogen fell when the patient went into crisis.

§ The Registrar-General has kindly informed me that no record of this patient's death has been registered up to June 30th, 1935.

blood pressure fell to 55/?. She was rescued from crisis by intravenous administration of 6·5 c.cm. eschatin (all that was available at the time) and rectal salines, and then treated with cortical extract (10 c.cm. a day—subsequently reduced to 5 c.cm.) and salt (15 g. in capsules) daily. By May 22nd she had practically normal blood electrolytes and was feeling very well and putting on weight. Cortical extract was then stopped, the salt being continued. She continued to improve clinically, feeling stronger all the time but her blood gradually became abnormal, and on June 25th cortical extract (5 c.cm. alternate days) was recommenced. She was discharged from hospital, much improved, on July 9th, taking 15 g. salt daily and 5 c.cm. eschatin twice weekly, but died at home in crisis on the 30th. Blood pressure, apart from crisis, varied between 80/50 and 90/60 most of the time in hospital.

Chemical findings (Table II.).—By the use of salt and cortical extract a nearly normal blood picture was attained, but on cessation of cortical extract the potassium and urea gradually began to rise, followed by a fall in the sodium and chlorine. The addition of small doses of cortical extract gradually altered the blood composition towards normal, though normality had not quite been reached again before discharge.

CASE 4.—A man aged 35, a labourer, was admitted to St. Andrew's Hospital, Bow, on May 24th, 1935, complaining of lethargy, anorexia, and dyspnœa. He had never been really well since a partial thyroidectomy in 1919 for Graves's disease. For four years he had noticed increased pigmentation of skin, more marked in summer, his friends saying "he looked like a black man." For seven months he had had increasing lethargy, anorexia, and dyspnœa, much more during the last two months.

Examination.—General condition poor. Marked exophthalmos. Universal pigmentation of skin and buccal mucosa. Thyroid gland (L) large: scar of thyroidectomy on right side.

Blood pressure 105/80. No radiographic evidence of tuberculosis. No suprarenal shadows. Basal metabolic rate: minus 37 per cent.

Progress.—An oral suprarenal preparation was tried, but without improvement; on June 13th he went into crisis and died suddenly on the 14th.

Post-mortem.—No definite adrenals could be found: on right side a small cyst was found in the position of the suprarenal, but sections did not show any adrenal tissue.

Chemical findings (Table II.).—The blood on June 4th showed in a very marked degree the typical changes of the condition; blood taken in crisis on June 13th showed more exaggerated changes: the rise of hæmoglobin from 82 to 88 per cent. is evidence of blood concentration. In this case the blood-urea did not rise during crisis (cf. footnote (‡) on page 1407).

CASE 5.—A coffee-stall keeper, aged 48, admitted to Charing Cross Hospital on May 18th, 1935, complaining of loss of energy and appetite, pigmentation, and loss of weight. Loss of energy noticed during last year, pigmentation had come on over same period. He had lost 2 st. in last fifteen months. Vomiting occurred once, three weeks before admission. Slight hæmoptysis once, some months before admission.

Examination.—Not particularly wasted; dark colour but no special distribution of pigment noticed. No definite pigmentation of buccal mucosa. Blood pressure on admission 106/80, but subsequently usually between 98/70 and 80/50. No other physical signs, except impaired percussion note at right apex. Radiography: no evidence of tuberculosis in chest; no suprarenal shadows. No tubercle bacilli found in sputum.

Progress.—After a control period of a week the patient was treated with eschatin, 5 c.cm. per day for one week; no significant change took place in the clinical condition during this period. After a further week, salt (15 g. a day) was given and on this treatment the patient began to feel stronger. He continued to gain strength, and was discharged feeling well on July 25th. He was instructed to continue taking 15 g. of salt a day. His weight on admission, 11 st. 10¼ lb., fell to 11 st. 5½ lb. on June 9th, and then gradually increased again to 11 st. 10¼ lb just before his discharge. He died at home on August 19th from acute osteomyelitis of the jaw, though otherwise he had kept well.

Chemical findings (Table II.).—Here again the potassium and urea came down to normal before there was any change at all in the sodium. There was evidence of increase of blood volume, the hæmoglobin falling from 102 to 80 per cent.

CASE 6.—A woman aged 47, a housewife, was admitted to St. Alfege's Hospital on Jan. 8th, 1936, complaining of loss of appetite and pigmentation: for last two months she had been very easily tired and was unable to do housework. She had got darker since summer of 1935. No diarrhœa or vomiting; nausea first thing in the morning; anorexia during last 2–3 months. Loss of weight during same period.

Examination.—General pigmentation, most marked in flexures, elbows, axillæ, and particularly in popliteal regions; also over clavicles; not much pigmentation in mouth. Blood pressure 89/66. Otherwise normal. Radiography: calcified opacities at right base but no infiltration elsewhere; no suprarenal shadows.

Progress.—She was treated with 15 g. salt in capsules daily, from Jan. 11th, and rapidly began to feel stronger; her appetite much improved, and the improvement continued until discharge from hospital on 15 g. of salt daily on Feb. 15th. There was no striking alteration in pigmentation, though the patient and her husband both thought she was lighter in colour. Her weight had increased by 2¼ lb. during the period in hospital.

Chemical findings (Table II.).—After a week's treatment with salt the serum had returned to nearly normal composition, except for a marked fall in serum protein from 6·6 to 5·2 per cent., indicating increase of blood volume. A fortnight later, sodium and chlorine remained nearly normal, and serum proteins had now risen to 6·1 per cent., suggesting synthesis of fresh protein.

Cases 7 and 8 are of interest because they were admitted to hospital for other complaints, and it was not until chemical examination of the blood had been carried out that the diagnosis was made. Case 7 was thought at first to be some form of neurotic vomiting and Case 8 was regarded as carcinoma of stomach. Case 7 showed no abnormal pigmentation, and in Case 8 the pigmentation was slight and unusual in distribution.

CASE 7.—The patient, a woman of 42, a housewife, was admitted to Lewisham Hospital on Jan. 17th, 1936, complaining of vomiting. For about five weeks she had taken almost no food. There was no diarrhœa. No note was made as to loss of weight.

On *examination* nothing abnormal was found except feeble heart sounds and a trace of albuminuria, but it was not until Jan. 29th that the blood pressure was measured and found to be only 60/40. The possibility of Addison's disease was considered, and a specimen of blood taken the same day showed the typical changes to a very marked degree: treatment with cortical extract and saline was started but the patient died on Jan. 30th. No pigmentation, except for large "freckles" on face and a small pigmented patch on right shin, was found; and the patient had had both of these as long as she could remember.

Post-mortem examination showed old calcified tuberculosis at the right apex, but no suggestion of any recent activity. The left suprarenal could not be found and the right was very doubtfully recognised as a small piece of tissue about 1·5 cm. across and 3 mm. thick. The kidneys (right 150 g.; left 130 g.) were very engorged, and capsule was slightly adherent; cortex was well defined and of normal thickness.

Histological examination (Dr. W. G. Barnard).—Right suprarenal: normal medulla, and chronic inflammatory infiltration of scanty remains of degenerate cortex; degenerate cortical adenomata. Left suprarenal: tissues round upper pole of left kidney showed a fragment of almost completely fibrotic cortex of adrenal. There was practically no normal cortex in the suprarenal sections, the recognisable cortical cells being all degenerate. Kidney: small foci of chronic inflammatory infiltration in cortex

TABLE II

—	Na.	K.	Ca.	Cl.	P.	HCO_3.	NPN.	Total protein.	Urea.	Hb.	Remarks.
CASE 1 1934											
Oct. 15th	277 (120)	40·0 (10·0)	11·1 (5·5)	316 (89)	3·15 (1·9)	53·7 (24·1)	57	5·72 (13·7)	..	..	..
„ 25th	277 (120)	..	..	298 (84)	..	..	..	..	..	..	Oct. 23rd–30th: Eucortone 6 c.cm. daily.
„ 31st	271 (118)	24·0 (6·1)	11·1 (5·5)	319 (90)	..	58·5 (26·0)	31	5·65 (13·7)	..	..	..
Nov. 8th	271 (118)	..	..	316 (89)	..	..	..	..	..	..	Nov. 8th: Salt, 10 g. daily.
„ 14th	278 (121)	23·0 (5·9)	10·8 (5·4)	317 (89·4)	3·8 (2·2)	..	52	5·68 (13·7)	..	..	Salt continued.
„ 29th	276 (120)	..	..	..	..	..	..	..	..	..	Salt continued after discharge.
CASE 2 1935											
Jan. 19th	283 (123)	26·0 (6·5)	11·1 (5·5)	330 (93)	4·5 (2·6)	45·0 (20·2)	54	6·4 (15·1)	76	80	..
„ 28th	270 (118)	28·0 (7·2)	11·4 (5·7)	326 (92)	3·7 (2·1)	43·0 (19·3)	33	6·55 (16·0)	49	61	Jan. 20th: Eucortone started. For dosage see Fig. 1.
Feb. 6th	264 (115)	..	..	328 (92·5)	..	..	..	..	..	65	..
„ 19th	292 (127)	24·0 (6·0)	10·0 (5·6)	330 (93)	3·6 (2·1)	58·0 (26·0)	28	5·88 (13·8)	24	60	..
Mar. 8th	295 (128)	16·2 (4·2)	8·6 (4·3)	343 (95·7)	2·1 (1·2)	60·6 (27·2)	33	5·0 (11·7)	18	50	Feb. 21st: Salt added.
„ 15th	288 (125)	..	..	330 (93)	..	..	..	..	..	..	..
„ 28th	271 (118)	17·6 (4·5)	9·4 (4·7)	326 (92)	1·9 (1·1)	56·6 (25·4)	31	4·96 (11·4)	24	54	Mar. 28th: Eucortone stopped.
Apr. 8th	281 (122)	25·2 (6·4)	9·9 (5·0)	323 (91)	2·7 (1·6)	43·6 (19·6)	49	5·9 (13·2)	54	..	Apr. 12th: Died.
CASE 3											
Apr. 10th	255 (111)	22·5 (5·75)	..	308 (86·6)	..	..	..	..	46	..	..
May 1st	244 (106)	31·2 (8·0)	..	..	..	..	..	..	91	..	Severe crisis. Cortical extract + salt started.
„ 8th	267 (116)	19·8 (5·1)	..	312 (88)	..	..	..	..	24	..	..
„ 15th	300 (130·5)	18·3 (4·7)	..	365 (102·8)	..	..	..	..	30	..	..
„ 22nd	305 (132·5)	17·0 (4·35)	..	366 (103)	..	..	..	..	32	..	Cortical extract stopped. Salt continued.
„ 29th	302 (131·5)	22·4 (5·7)	..	365 (102·8)	..	..	..	..	35	..	..
June 11th	302 (131·5)	25·1 (6·4)	..	369 (104)	..	..	..	..	40	..	..
„ 25th	275 (119·5)	26·6 (6·8)	..	317 (89·4)	..	..	..	..	45	..	June 25th: Cortical extract (5 c.cm. alternate days) re-started; no change noted in clinical condition, when sodium fell to 275 mg. per 100 c.cm
July 9th	289 (125·5)	22·0 (5·6)	..	350 (98·5)	..	..	..	..	42	..	..
CASE 4											
June 4th	251 (109)	23·5 (6·0)	10·3 (5·15)	294 (82·7)	4·2 (2·4)	51·9 (23·3)	37	6·7 (15·3)	56	82	..
„ 13th	219 (95·5)	28·0 (7·2)	..	235 (66·2)	4·1 (2·4)	..	..	..	44	88	In crisis.
CASE 5											
May 22nd	295 (128·5)	24·8 (6·4)	10·4 (5·2)	354 (99·9)	3·35 (1·9)	54·6	50	6·5 (15·3)	77	102	..
„ 29th	299 (130)	..	..	351 (99)	..	..	..	..	68	..	..
June 11th	296 (128·7)	24·8 (6·4)	10·3 (5·2)	355 (100)	3·4 (1·9)	41·0 (18·4)	65	6·0 (14·2)	75	95	June 6th–11th Eschatin 5 c.cm. daily.
„ 25th	296 (128·7)	19·8 (5·1)	10·8 (5·4)	365 (102·8)	4·0 (2·3)	41·5 (18·7)	43	6·67 (15·8)	48	88	June 12th to discharge, salt 15 g. daily.
July 9th	307 (133·5)	20·0 (5·1)	..	364 (102·5)	..	..	..	..	39	80	..
„ 24th	309 (134·2)	..	..	376 (106·1)	..	..	..	..	36	88	..
CASE 6 1936											
Jan. 10th*	262 (114)	21·7 (5·5)	10·3 (5·2)	305 (86)	5·1 (3·0)	47·0 (21·0)	55	6·57 (15·7)	66	90	..
„ 17th	303 (131·5)	16·0 (4·1)	..	365 (103)	..	..	24	5·17 (12·4)	24	66	Jan. 11th: Salt 15 g. daily.
Feb. 4th†	302 (131)	20·6 (5·3)	10·2 (5·1)	346 (97·5)	5·2 (3·0)	54·5 (24·5)	32	6·1 (14·6)	28	64	..
„ 21st	301 (131)	20·7 (5·3)	..	361 (101·6)	..	..	..	..	25	72	..
CASE 7											
Jan. 29th†	266 (116)	35·6 (9·1)	13·6 (6·8)	295 (83)	7·8 (4·5)	..	..	..	160	82	..
CASE 8 1935											
May 15th	265 (115·5)	21·3 (5·5)	..	..	..	..	..	..	60	..	..
CASE 8A											
Nov. 26th‡	309 (134·2)	..	8·2 (4·1)	355 (100)	3·0 (1·9)	59·5 (26·7)	25	6·8 (16·2)	22	..	..

* Mg. 2·2 (1·8). † Mg. 2·0 (1·7). ‡ Mg. 2·5 (2·1).

of greatly congested kidney. Dr. Barnard states that in his opinion the kidney lesions were very slight and very recent and unlikely to produce any symptoms.

Chemical findings (Table II.).—The most striking finding was the very high blood-urea (160 mg. per 100 c.cm.); this, in combination with the presence of casts and protein in the urine, made the diagnosis of uræmia a possible one. Against this diagnosis, the fall in the sodium was more marked than that in the chlorine, and the potassium was higher than usually met with in uræmia, although very high values are sometimes met with in this condition.

CASE 8.—A retired schoolmaster, aged 66, was admitted to Charing Cross Hospital on May 10th, 1935, complaining of loss of strength and weight for ten weeks. During the last six weeks he had been in bed suffering from anorexia and vomiting (but no diarrhœa), and had lost 1½ st. Neither he nor his wife had noticed any change in colour.

Examination.—A rather wasted elderly man: rather dark complexion, but not outside normal limits. There were patches of pigmentation over spines of each scapula and round the anus. No pigmentation in mouth and none noticed over flexures. No other abnormality except blood pressure of 80/60 on admission and 60/40 on May 23rd. The patient gradually sank and died on May 24th, in spite of treatment with cortical extract and saline.

Post-mortem examination revealed tuberculous scarring of upper lobes of both lungs. Both adrenals showed advanced tuberculous caseation, and there was a small patch of tuberculous infection in right kidney.

Chemical findings (Table II.).—The typical fall in sodium and rise in potassium and urea were found in this case.

CHEMICAL METHODS USED

All observations were made on venous blood collected anaerobically without stasis, and serum was separated without CO_2 loss, usually within 1½ hours after the blood was taken, and without exception within 3 hours.

Na.—Uranyl gravimetric method (Butler and Tuthill).

K.—Cobaltinitrite precipitation, direct on serum (Kramer and Tisdall). ‖

Ca.—Precipitated as oxalate, and washed by Clark and Collip's method.

Mg.—Colorimetric, magnesium ammonium phosphate precipitate.

Cl.—Open Carius method (Van Slyke and Sendroy).

P.—Colorimetric using stannous chloride as reducing agent (Kuttner and Lichenstein).

HCO_3.—CO_2 capacity method, using Van Slyke volumetric apparatus.

Protein.—Microkjeldahl (Howe).

Urea.—Colorimetric micro-urease (Archer and Robb).

CHANGES IN THE SERUM CONSTITUENTS ON TREATMENT

Sodium.—In all cases under first observation the sodium content of the serum was definitely below normal, and in three cases (Nos. 3, 5, and 6) out of four in which salt was given in adequate dosage it returned to more or less normal values on treatment with salt. In one case (No. 3) salt alone was unable to maintain the normal level, and small doses of cortical extract had to be employed (cf. Harrop, Soffer, Nicholson, and Strauss).[15] In two cases (Nos. 1 and 2) there was no appreciable alteration in the sodium under treatment with salt. In no case was the serum sodium altered significantly by treatment with cortical extract without added salt, though it should be pointed out that, with the exception of Case 2, none of the cases in the present series received more than 6 c.cm. cortical extract per day without salt. As has been pointed out by Stahl, Atchley, and Loeb[16] there is no correlation between the fall in the serum sodium and the retention of nitrogen in the blood, though the two changes are frequently encountered simultaneously.

Chlorine.—In general, serum chlorine figures ran very closely parallel to the sodium figures though the fall in the sodium is usually more striking than the fall in the chlorine. Harrop, Soffer, Nicholson, and Strauss[15] have shown that if sodium salts other than the chloride are used in treatment it is possible to have a high sodium content with a low chlorine, and they suggest that hydration is governed more by the sodium ion than the chlorine ion. None of the patients in this series was treated with any salt of sodium other than the chloride.

The *potassium* content of serum in all untreated cases was above normal, and in general returned to normal before the sodium showed any alteration. Similarly, in Cases 2 and 3 on cessation of treatment with cortical extract the serum potassium rose before there was any sign of fall in the serum sodium.

The *calcium* was usually within normal limits, but in Case 2, where there was marked plasma dilution, it fell from 11·4 to 8·6 mg. per 100 c.cm. as the serum protein fell from 6·5 to 5·0 per cent. In Case 7 it was abnormally high.

Magnesium was not estimated in the majority of cases: in the two where it was, it was within normal limits. In the majority of reported cases no estimation of magnesium has been recorded, so it is not clear whether a marked rise of serum magnesium such as is observed in adrenalectomised animals is to be expected.

The serum *bicarbonate* tended to be on the low side of normal, though not very strikingly so. In three cases (Nos. 1, 2, and 6) it rose appreciably under treatment, and, in fact, in Case 2 what rise there was in serum sodium was entirely accounted for as bicarbonate, the serum chlorine being essentially unchanged. In this case also, the bicarbonate fell to a subnormal value when cortical extract was omitted.

Inorganic phosphate was normal except in Case 6, where it was rather high and remained high, and Case 7, where it was very high. In Case 2 it came down to quite low values under treatment with cortical extract, and rose again when specific treatment was omitted.

The change in *serum protein* was followed in five cases. In two of these (Nos. 2 and 6) there was evidence of marked plasma dilution under treatment, in the former with salt plus cortical extract, and in the latter with salt alone. In Cases 1 and 5 there was no marked change in serum protein under treatment with cortical extract or salt, although patients showed clinical improvement. It is of interest in this connexion that Brown and Roth[17] found the blood volume normal in nine cases of Addison's disease. Brown and Roth however, in one case which "improved markedly," found a rise in blood volume from 81 to 97 c.cm. per kg. Case 6 is of particular interest: the serum protein fell from 6·5 to 5·17 per cent. after one week's treatment with salt, and then increased again to 6·1 per cent. after a further 2½ weeks. As the hæmoglobin, which at first was 90 per cent., remained about the 65 per cent. level during this period, and the patient was gaining weight, this suggests a rapid synthesis of new serum protein.

In general the hæmoglobin values yield evidence of blood dilution similar to that given by the serum protein figures.

The blood-*urea* was above normal before treatment in all of the cases described in this paper, and

‖ Watchorn and McCance[14] have shown that in normal blood there is no significant escape of potassium from the cells for about 7 hours; even with the low osmotic pressure of plasma in Addison's disease it seems unlikely that much change will take place in 3 hours.

returned to normal in Cases 1 and 2 with cortical extract alone, in Cases 5 and 6 with salt alone, and in Case 3 with salt plus cortical extract. In Cases 1 and 3 salt alone was not sufficient to keep the blood-urea within normal limits, but in Case 3 it began to return towards normal when small doses of cortical

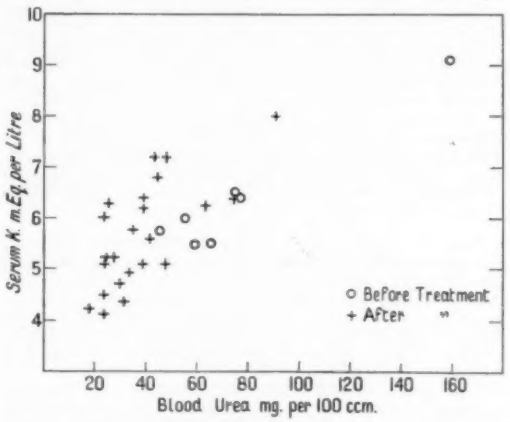

FIG. 2.—To show relationship between blood-urea and serum potassium.

extract were added. Harrop, Soffer, Nicholson, and Strauss [18] state that the rise in serum potassium runs in general closely parallel to the rise in blood-urea, and this correlation has been found in the present series. All the observations made during the course of the present work are shown in Fig. 2.

DISCUSSION

It is difficult from such a heterogeneous mass of data to draw any very striking general conclusions. The previously described changes in the blood of the untreated patient were found in every case, and on treatment there was a return towards normal. Comparing the two main forms of treatment—specific treatment with cortical extract, and symptomatic treatment with salt—it seems possible to suggest that cortical extract by itself has a marked effect on the blood-urea and serum potassium, but little effect on the sodium and chlorine. Salt with cortical extract is capable of restoring the blood picture to normal, but salt alone is not always capable of maintaining it normal.

Whether a high urea and potassium content are of clinical importance, if the patient is otherwise well, cannot be stated with certainty, but the findings in Case 3 suggest that a rise in potassium and urea may sometimes be a warning of impending fall of serum sodium and an indication for the addition of cortical extract (or increase in its dosage) as part of the treatment. It seems likely that the increase in serum potassium is at any rate in part due to increased tissue breakdown, and it appears desirable to check this wherever possible.

In addition to the cases described in this paper I have been afforded the opportunity of seeing a number of patients who have been treated in various ways and for varying periods, and in general the results bear out the suggestions made above. For example, a patient, F. C., under the care of Dr. H. S. Stannus, who had been treated by salt alone for a long time, had on two occasions potassium values of 26 and 25·8 mg. per 100 c.cm., although sodium and chlorine were normal; a patient, S., under the care of Dr. Levy Simpson, who was having insufficient cortical extract at the time (5 c.cm. a day only) and no salt, showed low sodium and chlorine (287 and 339 mg. per 100 c.cm. respectively) and high potassium and urea (24·4 and 64 mg.). Snell's [6] statement as to the normality of the blood in the chronic phase of the disease is not borne out by these results. The patients 1, 2, 3, 5, and 6 were all in a more or less chronic, though seriously ill, condition when admitted, and all showed marked changes in the blood.

The only exception is the patient C. A., whom Dr. Levy Simpson kindly allowed me to see: she had been treated with cortical extract for several years, and though clinically not well had a practically normal blood picture (see Table II., Case 8A). Previous observations, by other workers, on the same patient had always shown normal blood-urea and chloride; there were no previous observations on sodium or potassium.

SUMMARY AND CONCLUSIONS

(1) Eight cases of Addison's disease have been studied: all showed before treatment the chemical syndrome of low sodium and chlorine in the serum, with high potassium and urea. (2) The chemical findings suggest that cortical hormone will bring the potassium and urea down to normal, but has little effect on sodium and chlorine. (3) If potassium and urea begin to rise while the patient is being treated with salt it is advisable to give cortical hormone in addition. (4) In these cases there was not always a correlation between alteration in the patient's clinical condition and the level of the sodium and chlorine in the serum.

My thanks are due to Dr. Gordon Holmes, Dr. R. A. Hickling, Dr. Shirley Smith, and Dr. E. C. Warner, and to the medical superintendents of Hackney, St. Andrew's, St. Alfege's, and Lewisham Hospitals for allowing me to investigate the cases here described; also to other physicians, in particular to Dr. Levy Simpson for allowing me to make observations on patients who had already received treatment.

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BRISTOL HOMŒOPATHIC HOSPITAL.—Mr. W. Melville Wills, the president of this hospital, has given £20,000 towards its endowment fund in memory of his wife.

A NEW DYSTROPHY OF THE FIFTH FINGER

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So much has been written, so much surmised, and so much elucidated about bone disease in recent years that one hesitates to add to the superabundant articles on this subject. Three recent and similar cases, however, have prompted me to describe and classify yet another bone dystrophy, which appears to affect only the terminal phalanx of the little finger.

This condition was first reported by Kirner[1]; Kohler,[2] in referring to it as an extraordinary case, says the cause of the condition is still unknown.

It is described by Kirner as an unusual appearance of the terminal phalanx of the fifth finger on either side occurring in a girl of 13, of healthy stock and with a normal childhood, whose mother had noticed a curvature of the terminal phalanges for about two months. The child was a pale, slender girl of ordinary mentality. The ends of her little fingers appeared curved, and also shorter than normal. The other phalanges were normal. Skiagrams of the affected fingers showed that on each side the epiphysis for the terminal phalanx was normal, while the shaft showed some loss of bone structure, sclerosis, and a curvature towards the palmar aspect.

A case with a similar radiological appearance is described by Brailsford[3] as an unusual but characteristic pathological change in the terminal phalanx of the fifth finger. A girl, aged 9, for twelve months had noticed swelling at the end of her little finger. The surgeon who examined the finger sent her to be radiographed with a provisional diagnosis of enchondroma. There was no evidence of injury.

CASE REPORTS

In the last few months three cases of similar appearance have come to the writer's knowledge.

Case 1.—A girl, aged 11, the mother's third child, all the other children being normal. She had a normal birth and no instruments were used. The mother noticed 8–9 months ago curving of the tips of the fifth fingers, but the child complained of no pain. There was no tenderness at this stage on physical examination. There was no history of any similar deformity in the family, and the remainder of the fingers and toes appeared to be normal.

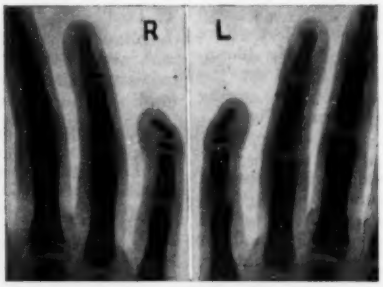
The skiagrams showed an unusual appearance of the terminal phalanx of the fifth finger on each hand. There was sclerosis of the epiphysis together with elongation and curvature of the shaft of the phalanx. The bone of the shaft had lost in some degree its normal structure.

Case 2.—A girl, aged 12, one of a family of five, all of whom were alive and well. Her birth was normal and no instruments were used. She was fair, mentally alert, but perhaps rather small in size for her age. Her mother had noticed that the tips of the child's little fingers had been bent over for some time. About 10 days before the examination the child fell over while doing physical exercises at school and hurt her finger, and the mother brought her to hospital preparatory to making a case against the school authorities.

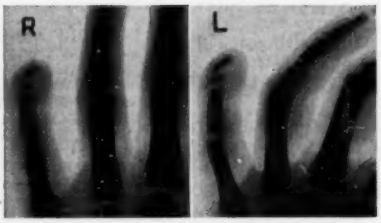
A skiagram of the fifth finger of the left hand showed that there was elongation and curving of the shaft of the terminal phalanx, the bone appearing to have lost, in some degree, its normal structure. The epiphysis did not appear to be involved. The remainder of the bones of the hands and feet showed no abnormality.

Case 3.—A girl, aged 8 years, the fourth of the family, the others showing no abnormality. This child had been born a month prematurely, and was rather small for her age. Mentally she was definitely dull and had rather a mongoloid appearance. Her mother had noticed 4 years before that the tips of the little fingers were curving, and had drawn the school doctor's attention to this, but no further steps had been taken.

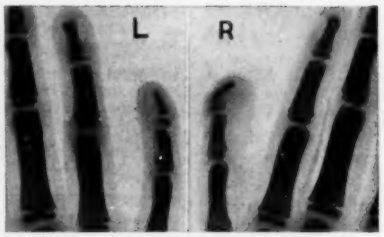
A skiagram showed a bilateral curving of the terminal phalanx of the fifth finger on either side, that on the right being most affected. There was definite loss of the normal bone structure of the shaft of each phalanx. The epiphyses did not appear to be affected. The remainder of the fingers and toes were normal.



Case 1



Case 2



Case 3

DISCUSSION

The almost identical radiological appearance in these cases makes it probable that the ætiology in all of them is the same. Kohler reports that the nature of the condition is unknown, while Brailsford classifies it as a characteristic pathological change, but commits himself no further. After consideration and reflection, however, it seems probable that this lesion is due to an osteochondritis. In all the cases the shaft of the phalanx, in addition to being bent, shows a definite loss of its normal bone structure, while in one case the epiphysis is definitely sclerosed; osteochondritis is the only known condition which would fit in these appearances. The phalanx takes on the curved "taloned" effect because in its probable earlier state of osteoporosis it has been unduly affected by the action of the flexor muscles, which are stronger than the extensors, with a resultant palmar bowing. Furthermore, all the recorded cases have been of an age when osteochondritis is most common.

These cases have some medico-legal interest, for in at least one of them the mother of the patient had

intended to sue the authorities of the school, alleging that the unusual appearance of the child's finger was due to some accident that had happened in the gymnasium.

SUMMARY

What is probably another manifestation of osteochondritis involving the terminal phalanx of the little finger is here described in 3 girls. All cases hitherto reported have appeared in female children aged 8–13. In 3 cases it was bilateral and in 2 unilateral.

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ABSCESS OF THE SPINAL CORD

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PATHOLOGIST TO THE HOSPITAL

Most writers on the subject of abscesses of the spinal cord have commented on the rarity of the condition. Woltman and Adson [1] made a searching review of articles on the subject in 1926, and were able to find records of only 29 cases; to these they added a further case of their own, and another has since been reported.[2]

The commonest causes of such an abscess were found by Woltman and Adson to be injuries or diseases of the spine, and chronic inflammatory diseases of the lungs. In one case it was associated with a meningocele which became infected, and in another there was a dermoid cyst over the cervical spine from which infection spread to the spinal cord. In only 2 cases is recovery recorded, in both the abscess being drained by operation; in the first the condition was associated with a fractured spine and a permanent paraplegia persisted, the lesion being in the twelfth dorsal region; Woltman and Adson's case, in which the abscess apparently resulted from suppuration at the site of a previous acute myelitis, made a complete functional recovery.

A girl, aged 3, was admitted to the Royal Hospital, Wolverhampton, on Oct. 29th, 1934, under Dr. J. H. Sheldon. There was a history of illness for the past 12 months, consisting of attacks of headache and vomiting. At first these attacks occurred at intervals of 2–3 weeks and lasted 12–24 hours, but during the previous month the attacks had become much more frequent, occurring nearly every other day. During these attacks she lost the use of her legs and her mother stated that she screamed with pain in her back when the pram was wheeled over rough stones; in between the attacks she was able to walk quite well. For the last week the headache had been more severe and persistent, the vomiting had occurred daily, and she complained of aching pains all over her body, and had quite lost the use of her legs. There was no aural discharge, and examination of the chest and abdomen was negative. There was no history of respiratory infection or disease of the ears, and she had been apparently quite well and normally developed until the onset of these attacks.

On admission her temperature was 101·4° F., pulse-rate 140, and respirations 32. She looked flushed and was somewhat wasted, the face having a drawn expression. There was much rigidity of the neck, the head being retracted, and a positive Kernig's sign. Any movement of the legs, which were spastic, appeared to cause her considerable distress. The reflexes in the upper limbs were normal, but the knee- and ankle-jerks were increased, and a positive Babinski's sign was present on both sides. No sensory changes could be detected.

Lumbar puncture was performed and thick blood-stained fluid withdrawn. On microscopical examination this showed pus cells and morphological pneumococci; a diagnosis of pneumococcal meningitis was made and one of us (S. C. D.) was asked to see the patient with a view to treating her with serum. The history did not suggest the usual type of pneumococcal meningitis and the changes in the reflexes in the lower limbs were an unusual feature. Serum was withheld; subsequent investigation of the pneumococcus showed it to be of neither Type I. nor II., and the question of serum treatment was therefore allowed to lapse. A tentative diagnosis was made of abscess somewhere in the central nervous system.

At this stage the sister in charge of the ward drew attention to a small dimple over the lower lumbar vertebræ, with a single hair growing from it, which had previously escaped notice. The surrounding skin was still stained with the iodine applied in preparation for the lumbar puncture, and the dimple was difficult to see; a radiogram, however, showed spina bifida, the neural arches of the 4th and 5th lumbar vertebræ being incomplete.

On Nov. 1st lumbar puncture was repeated; 10 c.cm. of foul-smelling frankly purulent fluid were first obtained; as the needle was being withdrawn a further 4 c.cm. of fluid of quite different appearance flowed from it. This latter specimen was turbid but not frankly purulent, and odourless. Both specimens of fluid on culture gave a growth of pneumococci and coliform bacilli but the chemical examination revealed striking differences. Whereas the purulent foul-smelling fluid gave a protein content over 0·50 per cent. and chlorides to the extent of only 0·56 per cent., the turbid odourless fluid had only 0·2 per cent. protein and 0·67 per cent. chlorides. The differences between the two specimens appeared significant and gave rise to the impression that a localised collection of purulent fluid lying somewhere within the theca and requiring drainage had been tapped. Cisternal puncture was also performed on the same day and 4 c.cm. of turbid cerebro-spinal fluid was withdrawn; films of this showed pus cells and mixed organisms, and the cultures yielded pneumococci, staphylococci, and coliform bacilli. Lumbar puncture was performed repeatedly during the subsequent days but the general condition showed no improvement and it was decided to explore the vertebral canal.

On Nov. 7th, 1934, under general anæsthesia, the spinous process of the 3rd lumbar vertebra and portions of the laminæ of the 3rd, 4th, and 5th were removed. A thick fibrotic stalk was seen to spread down from the subcutaneous tissues to the dura mater with which it was continuous, but this stalk appeared solid and it was not definitely ascertained whether it had any connexion with the small dimple of the skin. The dura, which was thickened and reddened, was incised; a small amount of turbid cerebro-spinal fluid escaped, but no pus was found such as had been aspirated previously, and the wound was therefore closed. A microscopic section across a portion of the fibrous stalk showed that it had a very small lumen, lined by squamous epithelium.

As was to be expected, no immediate improvement in the general condition followed the operation, but during the subsequent 3 weeks the temperature gradually subsided, and the pulse-rate dropped to the region of 120. The rigidity of the lower limbs, however, became more severe. Cisternal puncture was carried out on Nov. 13th, 20th, and 27th; the specimen on the latter date was still turbid but gave no growth on incubation. The cells were much fewer, being now 375 per c.mm., all pus cells. Lumbar puncture fluid on the same date yielded pneumococci and abundant pus cells, being definitely purulent. On Nov. 30th the patient's general condition was considerably improved, but the symptoms in the lower limbs continued. At no time during the illness did she have any incontinence of urine or fæces.

On Nov. 30th the spinal canal was again explored under a general anæsthetic. Before making the incision

a needle was inserted and thick pus withdrawn; the needle was left in situ and its track followed. On opening the dura the spinal cord appeared swollen and congested, and the needle was penetrating its substance, but on retracting the cord to one side it was found that the point of the needle did not project on the anterior surface. The needle was therefore withdrawn and the cord incised in the midline posteriorly. About 12 c.cm. of thick pus then escaped; this was lying in a cavity in the centre of the cord, the cavity being 1 cm. in diameter. It extended up the spinal cord beyond the limit of the incision in the dura, and a probe easily passed up a further 5 cm., the upper limit of the cavity not being reached. A small rubber drainage-tube was then inserted into the cavity in the spinal cord, and a corrugated rubber drain placed into the opening in the dura, these being brought out through the wound which was sutured above them.

After the operation there was slow but steady improvement in the general condition, but the spasticity of the lower limbs persisted. The wound continued to discharge pus and cerebro-spinal fluid for about 3 weeks, after which it rapidly closed to a small sinus.

On cisternal puncture on Dec. 26th, clear and colourless cerebro-spinal fluid was withdrawn; this yielded no pathogenic organisms, and only 15 cells per c.mm., these being all lymphocytes.

She was discharged from hospital on Jan. 25th, 1935, when there was still considerable spasticity of the lower limbs, but the wound in the back was completely healed except for a small superficial ulcer. At the time of leaving hospital she had been able to walk with assistance, but 3 months later the spasticity had entirely disappeared and she walked quite normally. The wound in the back was healed, and there were no abnormal physical signs. The wound broke down 9 months later and discharged some pus for a few days, after which it closed again and has since remained closed.

In April, 1936, she had no headaches, could enjoy herself playing with other children, and was mentally normal for her age.

DISCUSSION

In the case here recorded it is impossible to give a definite opinion on the cause of the abscess, but it seems probable that, associated with spina bifida, there was a sinus analogous to a coccygeal sinus but situated in the lumbar region, leading down to the dura, and that infection had spread by this route from the skin to the dura and spinal cord. A remarkable feature is the duration of the symptoms; it seems probable that a localised infection of the meninges in the neighbourhood of the sinus had existed for at least a year before the onset of the symptoms for which the patient was admitted to hospital; these symptoms appear to have been associated with generalised spread of the meningeal inflammation.

At the first lumbar puncture on Nov. 1st the purulent fluid withdrawn showed only 0·56 per cent. of chloride; this represents a gross diminution. The turbid fluid withdrawn at the same puncture and which represented an actual sample of the free cerebro-spinal fluid showed chlorides to the extent of 0·67 per cent.; this was evidence of a separate source for these two samples. A level of 0·67 per cent. is near that usually met with early in a severe meningitis to which a fatal issue may be expected. On Nov. 28th, 3 weeks after the first operation, fluid withdrawn both by lumbar and cisternal puncture showed a level of 0·68 per cent. indicating that there had been no further advance in the inflammation of the meninges. On Dec. 28th, 4 weeks after the second operation when the general condition was improved, the chloride level was 0·71 per cent., and by Jan. 1st it had risen to 0·74; at this date except for a protein content of 0·180 per cent. the fluid was in all respects normal.

The chronicity of the meningitis is a point of interest, for the course was quite different from that ordinarily seen in pneumococcal meningitis. This may have been due either to the establishment of some degree of immunity by the patient or to relative avirulence of the organism; these aspects of the matter were not subjected to investigation. It should be emphasised that the whole picture both from the clinical and laboratory standpoints was entirely different from that met with in true pneumococcal meningitis; this case should not, therefore, be included among the very rare examples of recovery from that condition.

The thanks of the authors are due to Dr. J. H. Sheldon for access to the patient and to the records of the case.

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REVIEWS AND NOTICES OF BOOKS

Nouvelle pratique dermatologique

By Drs. J. DARIER, R. SABOURAUD, H. GOUGEROT, G. MILIAN, L. M. PAUTRIER, P. RAVAUT, A. SÉZARY, and CLEMENT SIMON. Paris: Masson et Cie. 1936. In eight volumes. Inclusive price in advance, Fr.2000.

THIS treatise, of which five volumes have now been issued, is a most comprehensive and authoritative compilation. There are no less than 7350 pages of text in the volumes already published and a collection of illustrations in colour and half-tone reaching the immense total of 2425. The responsible editors, who constitute the directorate, are named above; to their number must be added a list of 80 contributors, each distinguished for original research or particular experience in the special subject allotted to him. An index is to follow in the eighth.

The first volume deals with cutaneous anatomy and physiology, general histology—profusely illustrated by A. Civatte from the well-known collection at the St. Louis Hospital—ætiology, pathology, semiology, diagnosis, and general therapy. The four authors in intimate collaboration here are Darier, Civatte, C. Flandin, and A. Tzanck. The last named is responsible for the article on ætiology, and according to Darier has formulated therein some new conceptions which are likely to influence the future development of our views on cutaneous reactions in general. There must be a more careful discrimination between what is meant by intolerance and intoxication. The two terms are frequently confused even by accepted authorities, some of whom appear moreover to have no clear conception of the difference between real and apparent causation, and are apt to overlook or ignore the multiplicity of factors usually operating in the production of even simple reactions. A brief glance at the table of causes on pp. 367–369 in which causes are divided into (*a*) "Efficientes," which we might perhaps translate as evocative, and (*b*) Predisposing, and their superimposition on pp. 466–469 in the form of a "Tableau Synoptique," will suggest how complex and contingent are modern conceptions of ætiology. An entirely new departure is the section

of 31 pages given to the examination of a patient suffering from a skin affection (pp. 554–585). The same ideas are here emphasised. Itching, for instance, is stated to be a symptom of *intolerance*; its absence, as in syphilis or tuberculosis, suggests *intoxication*. The meaning of pruritus and the help it can afford in the diagnosis of an obscure metabolic affection are analysed in the greatest detail and this section will repay careful study by any physician faced with an unusually difficult problem in dermatology.

The digestive apparatus from the tongue downwards, the gums and teeth, the mobility of the soft palate, the state of the lymph glands, the liver and pancreas may all have a bearing on the course or genesis of the affection studied. The examination of lungs and mediastinum and the kidneys and other organs by appropriate measures are all points which the physician is not likely to neglect, and a résumé of appropriate clinical laboratory investigations is given. All that is known on the association of the neuro-vegetative and endocrine systems in cutaneous disorders and diseases is also set out and this section demonstrates how extensive must be the equipment of the modern dermatologist. The volume ends with a dissertation on general therapy.

Vol. II., for which ten authors are responsible, begins with a profusely illustrated study of the diseases caused by animal parasites. The acari infesting the cat, dog, horse, and sheep differ both in their morphology and symptomatology from the human species and are separately considered. The chapters on ringworm and the mycelial infections of the human skin are by Sabouraud, whose classical work "Les Teignes," published many years ago, has become the inspiration for those later studies of blasto- and sporo-trichosis, mycetoma (Madura foot), moniliasis, and other mycelial diseases which are here fully described and illustrated, mostly by the original investigators themselves. The concluding third of this volume is devoted to syphilis, and has been written by G. Milian. Of particular interest is the plea he makes, in his section on treatment, for the administration of larger doses of the salvarsan group. He bases his argument on the assumption that the lethal dose for a man of average weight is 10 grammes and that the injection of small doses at the relatively long interval of a week is the cause of most of the cases of so-called refractory or salvarsan-fast syphilis, and the other undesirable sequelæ occasionally met with.

Vol. III. carries the dissertation of syphilis to the later stages and discusses the regional varieties in complete detail. Stress is laid on the value of the CO_2 pencil treatment of leukoplakia of the tongue and cheeks—one of the most intractable of all luetic affections. It is suggested that a minimum of 1 minute exposure with a 1 pound pressure through a thin layer of gauze is an efficient dose. Every aspect of the disease, on which the author may be regarded as an authority worthy to succeed Fournier, is dealt with in the succeeding pages, which conclude with an article describing the various tropical varieties encountered in Asia and Africa. Pian—frambœsia or yaws—is next discussed, and studies on leishmaniasis and Delhi sore are well illustrated. The long treatise on cutaneous tuberculosis and tuberculides, by Pautrier, one of the most careful workers and authors in this domain, provides a most important contribution to the literature of the subject and one that will be widely studied and quoted. Preference is given to the tuberculous as opposed to the streptococcal and other theories in the genesis of lupus erythematosus. Leprosy is also described in this volume. Milian has made himself responsible for the articles in Vol. IV. on the streptococcides, in which he includes impetigo, and the vexed ætiological question of the so-called acrodermatitis continua. Common associations of streptococcal infections, such as scabies and ringworm, are separately discussed and illustrated. Sabouraud gives an account of furunculosis and sycosis barbæ et generalisata under the heading of "folliculites," and reprints his well-known diagrams which did so much to establish an ordered classification among staphylococcal infections of the skin. The dermatoses due to ultramicroscopic and filtrable viruses include the common wart and its varieties, molluscum contagiosum, certain papillomata, and the herpetic group. These are discussed in detail and well illustrated under the combined authorship of Paul Ravaut and Marcel Ferrand. This section is followed by a useful contribution on the eruptive fevers, including "fourth" disease, a name first suggested by Dukes of Rugby in 1900, and to this day a somewhat doubtful entity (rubéole scarlatineuse). A most interesting section by Milian worthy of close study is that given to the drug eruptions, which nowadays are more often seen as new medicaments are introduced. Their variety has necessitated a complex tabulation according to the morphology of the lesions resulting. Thus we may have eczematous, urticarial, polymorphic-erythematous, erythemato-squamous, nodular, acneform, purpuric, and so forth—veritable equivalents and competitors both in number and variety of the dermatoses due to infective and metabolic causes. In view of its frequent incorporation in proprietary laxatives, phenolphthalein dermatitis receives special mention and illustration. Equally worthy of note are the arsenobenzol, thallium, and barbitone eruptions. The whole of this large section has been carefully compiled and generously illustrated, and is probably the most complete of its kind yet published.

In comparison with the detailed discussion of the foregoing, urticaria, one of the commonest and most troublesome of all skin manifestations, receives but scant consideration (C. Flandin and others, pp. 1–35, Vol. V.). Its treatment by specific and non-specific desensitisation, by injection of sodium thiosulphate (Ravaut) and calcium are duly tabulated. "Eczema" is retained as a nosological entity and is defined as a "vesicular dermo-epidermal reaction which can be caused in predisposed subjects by numberless pathogenic factors habitually innocuous to the skin of a normal individual" (A. Sézary and A. Horowitz). The various clinical forms are illustrated and discussed in detail, and a separate section is given to the eczema of infants. The "eczematides," a name first suggested by Darier to cover a group of eczema-like eruptions of erythemato-squamous type, such as our so-called "flannel rash"—a seborrhœic manifestation—are considered by Sézary in a separate chapter. The name is not much used outside France, and has so far not received general recognition as a separate entity. That much disputed condition dysidrosis of the hands and feet is also discussed in a separate chapter. The conclusions as regard its ætiology favour a mycelial origin, but are on the whole non-committal. Even this disease has not escaped the suspicion, so prevalent in France, of a congenital syphilitic basis (Milian). This volume also deals with the various forms of prurigo and pruritic diseases of uncertain causation. The chapter on Raynaud's syndrome by Nicolas and Ravaut will be studied with special interest in view of the

recent advances in its therapy by surgical means, periarterial sympathectomy, ganglionectomy, and so forth. The new disease, erythrocyanosis cruris puellarum, has been dignified with a special chapter, and its ætiology clarified so far as that is possible. The consideration of a large number of vascular abnormalities, including purpura, leg ulcers, gangrene, and conditions associated with blood diseases follow in detail. An extensive consideration of psychopathic dermatoses, newly classified by Clement Simon, merits special study as a sign of the times.

We await with keen interest the completion of this great work.

Fluorescence Analysis in Ultra-violet Light

Second edition. By J. A. RADLEY, M.Sc., A.I.C., and JULIUS GRANT, Ph.D., M.Sc., F.I.C. London: Chapman and Hall Ltd. Pp. 326. 21*s*.

FLUORESCENCE analysis in ultra-violet light is by no means new, but it is only fairly recently that it has come into its own. Like most applications of physical method to other branches of science, it suffered at first from the unjustified optimism of those interested in it, but its practical value is now recognised. Moreover, there are now available light sources which emit ultra-violet light sufficient in quantity and quality for most purposes of fluorescence analysis.

This book opens with a theoretical account of electro-magnetic waves, embodying a useful chart which shows the range of radiations at present recognised. An account follows of the methods available for the production of ultra-violet light, as this relatively short range is mostly used as the exciting radiation in fluorescence analysis. Filters or other methods of isolating short ranges of wavelengths are then described. Most attention is given to the mercury arc as a source of light; other sources that are in some respects and in some circumstances more satisfactory are not so fully described. Measurement of intensity of radiation receives inadequate notice; it is admittedly a difficult branch of work but its importance should have been emphasised. Some definite expression of opinion by the authors on the methods available would have been welcome; the mere recapitulation of the results of others is not enough. Methods and technique are described at some length, but the short section dealing with microscopy is both inadequate and misleading. It is difficult to see how anyone starting fluorescence microscopy, and such work is becoming increasingly important, could regard the information provided as satisfactory even for an introduction, and in a future edition considerably more space ought to be allocated to this aspect of the subject. The book is well produced and illustrated.

The Silver Fleece

An Autobiography. By ROBERT COLLIS. London: Thomas Nelson and Sons, Ltd. 1936. Pp. 290. 15*s*.

Dr. Collis is an Irishman still on the right side of forty who wears his heart on his sleeve. Born in Ireland, he was bred at an English public school which never succeeded in moulding him to that conventional pattern which has excited so much favourable and unfavourable criticism. Though just old enough to join the army during the war, he missed active service abroad, and his pacifism is founded not on personal experience of the horrors of war but on the conviction that wars are terrible things and should not occur. He has played international "rugger," spent a year at Yale and, as a boy, saw at first hand something of the trouble in Ireland. Apart from these, his experiences have not been exceptional, but he contrives to make them interesting without being melodramatic, except perhaps when writing of sick children in hospitals. Dr. Collis is a mezzo-brow, neither high nor low. He writes unaffectedly, and one is left with the impression that few of his contemporaries could have made of their memoirs such good reading. The decorations, by T. G. Wilson, are an asset.

Orthopædic Surgery

Second edition. By WALTER MERCER, M.B., Ch.B., F.R.C.S., F.R.S. Edin., Assistant Surgeon to the Royal Infirmary, Edinburgh. London: Edward Arnold and Co. 1936. Pp. 906. 40*s*.

IN its second edition this book is very much enlarged. It has some 200 extra pages and 37 additional illustrations. Mr. Mercer has added considerably to the part dealing with congenital deformities and has included two new chapters on circulatory disturbances of the extremities and manipulative surgery.

By far the best part of the book is the first which deals with congenital deformities and diseases of bone, including tubercle, though there are some important omissions, for example, of any picture of the Denis Browne splint for the treatment of congenital equino-varus. The section on bone tubercle is amply illustrated and contains a fair and concise résumé of recent work, including the important researches of Seddon and Butler on Pott's paraplegia. As a whole when the author deals with subjects of general surgical interest the book is good, but when he ceases to be a general surgeon with an orthopædic bent and speaks about pure orthopædics the balance is less sure. In his anxiety to include new matter he has failed to bring up to date some of the sections in the original, for instance the description of the treatment of pes cavus. The review of flat-foot, a subject of profound interest to orthopædic surgeons, is inadequate and no mention is made of the association of rigid flat-foot with focal sepsis.

In spite of these defects this book is undoubtedly a useful one for the third-year student. Mr. Mercer has taken so much trouble that it might almost be regarded as a dictionary of terms used by surgeons in connexion with bone, joint, muscle, circulatory, and nerve conditions. If it does not succeed in stimulating the interest of a student in orthopædic surgery, this is because it does not lay sufficient emphasis upon the general principles of orthopædic work or stress the differences in outlook between the orthopædic and general surgeon. The eradication of disease and the correction of deformity is not the main interest of the orthopædic surgeon. His chief concern is to restore or improve function. He may often advise against the correction of a deformity, or, conversely, in order to improve function he may actually create a deformity. It is this fascinating aspect of orthopædic surgery to which less than justice is done in this otherwise satisfactory book.

ONE FLAG DAY.—The possibility of one big flag day for all the London hospitals is under consideration. This would take the place of the 66 hospital flag days at present held every year in London and the suburbs.

THE LANCET

LONDON: SATURDAY, JUNE 20, 1936

BACTERIAL EVOLUTION

RELATIONSHIPS, more or less remote, between various species of bacteria have long been recognised, and schemes of classification have been introduced which seek to indicate something more than degrees of similarity or dissimilarity. The analysis of structure offers a very elementary separation of bacterial types; physiological characters, determined with varying degrees of crudity, have been the guides to the nicer differentiation of species. Mr. KNIGHT, in a monograph on Bacterial Nutrition,[1] has made an extensive survey of the more exactly determined physiology of bacteria, and has tried to coördinate his observations by the help of an evolutionary scheme for the schizomycetes. The first part of his report surveys the facts; the second is devoted to coördination of observation; and the third to the mechanism of nutritional variation.

Bacteria may be arranged in a scale of increasing complexity of nutritional requirements. At one end are organisms with a wide range of synthetic ability, capable of obtaining energy and materials for the synthesis of their protoplasm from the simplest chemical compounds; such are the photosynthetic bacteria, resembling the green plants in obtaining energy mainly from light, and certain chemosynthetic bacteria, whose production of energy depends entirely on the chemical reactions they initiate. Intermediate between these organisms, utilising inorganic matter, and the bacteria which derive energy by the breakdown of complex carbon compounds, are bacteria which absorb CO_2 or simple organic compounds for their carbon (oxidising hydrogen for the purpose), or utilise CO, CH_4, or similar hydrocarbon as a source both of carbon and of energy. Next in the scale of complexity come organisms like *Bacterium coli* and *Pseudomonas pyocyanea*, requiring complex carbon compounds as source of energy and carbon, but assimilating nitrogen as NH_3 for the synthesis of their protoplasm. *Bact. typhosum*, *dysenteriæ* Shiga, *paratyphosum* A, and *Proteus vulgaris* occur as "exacting strains," requiring amino-acids for their nitrogen, from which "non-exacting" strains, utilising NH_3, can be derived. They form a link between types like *Bact. coli* and those (such as the acid-fast bacilli and the diphtheria bacillus) which cannot grow unless amino-acids are present as a nitrogen source. Even among the members of a single group, however, there are differences of nutritional requirements. The acid-fast bacilli, for example, are capable of arrangement in a special series which corresponds, as in the main series, to a progressive restriction in utilisable sources of energy and food—viz., the saprophytic acid-fast bacilli which are least fastidious, the cold-blooded, avian, and finally the human types of tubercle bacillus. Johne's bacillus is the most fastidious, being apparently unable to synthesise a substance, essential for its growth, that is readily supplied by the Timothy grass bacillus and the human tubercle bacillus. The increasing complexity of nutritional requirements is associated with decreasing synthetic powers, which include the capacity to synthesise essential growth substances. These substances are analogous to the vitamins of animal metabolism. They have been prepared as potent concentrates by Mr. KNIGHT and his associates, and found essential for the growth of certain bacteria. They include (*a*) the "sporogenes" factor, synthesised, for example, by *Bact. aertrycke* and *Aspergillus versicolor*, found in yeasts and mammalian urine, and required already formed for the growth of *Clostridium sporogenes*, *botulinum*, and *welchii*; and (*b*) the "staphylococcus" factor, synthesised, for example, by *Pseudomonas pyocyanea* and *Vibrio choleræ*, and essential for the growth of staphylococci and *Bacillus anthracis*. At the upper end of the scale are organisms not yet grown in synthetic media of known composition, whose special requirements are supplied by chemically indeterminate mixtures like enriched nutrient broth. The group includes the influenza bacillus with its peculiar requirements of X and V factors, the brucella organism, the streptococci, pneumococci, the meningococcus, and the gonococcus.

The series arrived at by arranging the bacterial species as briefly described is claimed to be more than a merely static classification, similar to those put forward by FISCHER and ORLA-JENSEN; it represents an evolutionary series. Mr. KNIGHT bases his arguments on the following facts. In the course of world evolution, the simpler carbon and nitrogen compounds presumably developed first; and the bacteria that first arose would presumably be those capable of utilising NH_3 and CO_2. This explanation is too teleological to be readily acceptable, for it assumes that the most likely form of life was that best suited to *generally* prevailing conditions; whereas the origin of a "living" chemical process, or the development of a more complex one, seems equally likely to have been the result of a peculiar, not a general, set of conditions, which could as readily give rise to protoplasm of limited synthetic abilities as one of wide. The evolutionary process may thus have been not a restriction of simple synthetic powers, but the acquisition of wider ones. But postulating organisms like the present-day CO_2- and NH_3-utilising forms as the primitive type, the series following them is linked dynamically by the occurrence of strains of the same species at different nutritional levels: by the experimental adaptation of strains to different nutritional requirements; and by the poor synthetic ability[2] of the

[1] Bacterial Nutrition. Material for a Comparative Physiology of Bacteria. By B. C. J. G. Knight, M.Sc. Med. Research Council, Spec. Rep. Ser. No. 210. London: H.M. Stationery Office. 1936. Pp. 182. 3s.

[2] In addition, analogous evolutionary series can be formed for certain protozoa, supported in this group of organisms by correlated changes in anatomical structure.

predominantly and exclusively parasitic forms. If parasitism is regarded as a late adaptation in evolution, the characters of parasites are presumably late adaptations; and it is unlikely, as Mr. KNIGHT says, that the majority of pathogenic bacteria appear by chance in the class of organisms whose nutrient requirements are not satisfied by simple synthetic media. In the course of his survey a correlation does in fact appear between pathogenicity and differences of nutrition. Even bacteria like *Bact. typhosum*, that can be trained to utilise simple compounds, are more fastidious when first isolated from the body of a host.

The most persuasive evidence lies in the varying requirements of strains of the same species, and the demonstration that bacteria can apparently produce new enzymic systems to cope with new substrates. But this flexibility is confined to comparatively small portions of the immense scale of nutritional evolution that Mr. KNIGHT sketches. There is, however, no evidence for postulating a more complex evolutionary series, though it is improbable that this progressive loss of wide synthetic ability, together with the late acquisition of special abilities, such as the synthesis of lysins and toxins, is necessarily a true picture of an evolutionary tree; there may be regressions and wide digressions with re-entrant paths that complicate the main series beyond recognition. But the simplified picture forms a valuable groundwork upon which to build a bacterial classification; for, by the very nature of the criteria upon which carefully investigated strains are admitted to it, it remains flexible and empirical, yet with an empiricism that rests on a reasonable, though limited hypothesis. In reaching his conclusions Mr. KNIGHT provides critical reviews of the gaseous requirements of bacteria and of the various methods of study of bacterial metabolism (especially the preparation of synthetic media), the differentiation of essential food substances from accessory food substances, and the technique of "training" bacteria to grow in simple media. Hence there is much in his report which will interest the general bacteriologist, though the scheme for the practical use of the evolutionary classification that is put forward is at present applicable only in laboratories devoted to the kind of work that the author has both reviewed and furthered.

INSULIN IN SCHIZOPHRENIA

"I HAVE known four and twenty leaders of revolts," said OGNIBEN. It is not necessary to have lived as long as OGNIBEN to have known four and twenty treatments of schizophrenia. In any survey such as HINSIE'S or MÜLLER'S one finds a lengthy catalogue even for the last decade. There are few therapeutic discoveries or fashions in medicine that are not sooner or later tried out upon the schizophrenic, who must also suffer fresh applications of the old principle that terror and shock are good for the insane, especially the apathetic insane; the method of "emotion therapy" reported in a psychiatric journal in 1930 had some points in common with the whirling chairs and the trapdoors of earlier times. The reported success of various ways of treating schizophrenia makes impressive reading until one observes that ten or fifteen years after their introduction they are discarded. Endocrine therapy of opposite sorts (thyroidectomy, for example, as well as thyroid medication); prolonged narcosis; infusion of all manner of drugs and sera into the blood stream; the production of aseptic meningitis, leucocytosis, controllable fever; high-frequency currents and other forms of physiotherapy; extirpation of dubiously septic foci; psychotherapy of many kinds—all have had their more or less ephemeral heyday. In the last year or two gold salts have been tried by some, the induction of epileptic convulsions and the injection of cerebrolysates and cerebrotoxins by others; still another innovator has been gouging out pieces of the frontal lobe. Schizophrenia is certainly not one of the diseases given over to therapeutic nihilism, whatever people and text-books may say. Nor is it one of the diseases about the cure of which it is wrong to be sceptical. Recovery or remission happens often enough in schizophrenia under non-adventurous care to explain some of the success of new methods and to warrant caution in acclaiming them.

There is one new method of treatment that differs from its predecessors in several particulars. First, it is more deadly. Day after day, of set purpose, the patient is put in danger of his life; the treatment is not being properly carried out unless grave risks are run. Secondly, it is supported by an eminent and reputable authority, Prof. PÖTZL, in whose clinic it has been worked out; he declares it superior in its cures to every other method. Thirdly, it is reported to produce over 70 per cent. of full remissions, an unusually high figure. The method, which consists in giving huge doses of insulin, up to 190 units, so that the patient becomes comatose, with twitchings, sweating, and sometimes glottic spasm, transitory hemiplegia or epileptic fits, has been elaborated in Vienna by Dr. MANFRED SAKEL [1] who had earlier used hypoglycæmic shock in the treatment of drug addictions. It may be useful to consider the three points mentioned above before the method is either rejected or experimented with in this country. Its lethal risks are not an essential objection to it, any more than they were to the malarial treatment of G.P.I., but they impose upon every doctor who proposes to try the method the duty of reading the literature carefully and himself staying by the patient continuously during the hours of the daily hypoglycæmia, ready to intervene if the collapse goes too far. Dr. SAKEL'S account of what may happen makes it clear that the responsibility is a heavy one and that it should not be delegated; moreover, the treatment should never be carried out without very skilful and special nursing. The second point need not be given undue weight, for Dr. J. BERZE,[2] the greatest authority on schizophrenia

[1] Neue Behandlung der Schizophrenie, Leipzig u. Wien, Perles, 1935; Wien. med. Woch., 1934, lxxxiv., 1211, 1265, 1299, 1326, 1353, 1383, 1401; 1935, lxxxv., 35, 68, 94, 121, 152, and 179.

[2] Wien. med. Woch., 1933, lxxxiii., 1365.

in Vienna, has written an article which is strongly critical of this treatment; he thinks it may do as much harm as good. The third point, the high proportion of recoveries, has been justly criticised[3] on the ground that it is in the early cases that Dr. SAKEL reports his 70 per cent. of full remissions after treatment; we are not told what proportion of the advanced cases got better. Everybody knows how high is the percentage of recoveries in early cases of schizophrenia quite apart from special treatment. Nor does Dr. SAKEL say for how long the patients remained under his notice afterwards; temporary and deceptive remissions are nothing out of the ordinary in schizophrenia. He could not have assessed the prognosis beforehand, because in some of his cases treatment was begun on the first or second day after admission. There is nothing in the report of Dr. SAKEL, or of his Polish imitators, to indicate that the treatment is worthless, but neither is there much at present to recommend it.

EPIDEMIOLOGY OF WHOOPING-COUGH

THE Registrar-General's reports show that in England and Wales the deaths attributed to whooping-cough in the last completed decade, 1921–30, were rather more numerous than those debited to measles, or to scarlet fever and diphtheria combined. In subsequent years the position has been rather more favourable—both relatively and absolutely—to whooping-cough, the yearly attribution of deaths in 1931–34 being, roughly, 2400 to that disease, 3100 to measles, 2900 to diphtheria, and 700 to scarlet fever. In spite of this reduction—perhaps temporary, for the epidemic swing of such diseases makes the rate over a short period of years unreliable—we still have a number of deaths that is far from negligible and the more to be deplored in being nearly entirely concentrated on the first five years of life. The ubiquity of the disease, combined with its generally low fatality-rate, tends to make the layman rather contemptuous of this so-called childish malady, though the medical profession is well aware of its dangers. Recent experiments with *Hæmophilus pertussis* vaccines suggest that prevention may lie in that direction.[4] Increased knowledge, still somewhat scanty, of the epidemiology of the disease, is also likely to assist towards that end. To that knowledge a useful contribution has been made by Dr. RALPH E. WHEELER, working for the Milbank Memorial Fund.[5]

During the last five years there has been, Dr. WHEELER records, an annual average of 5500 deaths from whooping-cough in the United States registration area, and it ranks among the outstanding causes of mortality among children in the first two years of life, a position clearly parallel with that of this country. To study its epidemiology a rural section of New York State, with a population of 5500 persons, was chosen and a careful record of communicable disease kept there for three years. During that period 280 cases of whooping-cough (with no deaths) were registered, 260 of them being persons under 20 years of age, giving an attack rate of 46 per 1000 person-years of exposure at these ages. Only 6 of the 260 persons attacked at ages under 20 gave a history of previous attack, which indicates a high degree of immunity. Not many of the persons in this area had escaped the disease at one time or another, for at age 20 a remembered history of manifest whooping-cough attack was given by about 80 per cent. of them. From a detailed regional and chronological analysis of the cases it is concluded that some 12 per cent. could be classified as primary cases infected by sources which could only be surmised, 14 per cent. could be reasonably attributed to casual neighbourhood or "vicinal" contact, 23 per cent. to infection at school, and 51 per cent. were secondary cases in the home due to familial contact. The excessively high risk of infection within the home is shown by the fact that up to age 15 approximately 90 per cent. of the susceptibles—i.e., without a history of previous attack—succumbed on exposure to a case in the family. Secondary attack rates on susceptibles in attacked schools were considerably lower, being estimated at 41 per cent. at ages under 10 years and 15 per cent. at 10 years and over. On the other hand, Dr. WHEELER emphasises the fact that if the word *spread* be defined as distribution among households instead of among individuals in the community there is no doubt that school attendance in this rural area was responsible for more cases than any other influence. The disease did not become widely distributed except through school attendance.

Can any measures be applied to restrict infection in an attacked school and thus in the homes of the neighbourhood, where the pre-school child is particularly in need of protection? Dr. WHEELER puts forward a number of suggestions. A communicable disease history of each pupil should, he maintains, be recorded on entrance to school and brought frequently up to date. This would identify the susceptibles. Three possible experimental procedures might then be applied: (*a*) The dismissal from school for a few days of any susceptible child with a cough of the dry consecutive variety. The loss of school time—apart from other factors—through false alarms might be more than saved by a reduced incidence of whooping-cough. (*b*) The use of gauze masks by all susceptibles showing suspicious symptoms. (*c*) Inoculation, which in such an area as this might well be tried as a controlled experiment. But even effective preventive action could at the best, according to Dr. WHEELER'S calculations, reduce the incidence by only about one-half. Had a perfect system of prophylaxis been applied in the schools of this area at the time of the survey it would have eliminated, he computes, 66 cases which were secondary to primary cases in the various attacked schools, and 75 cases secondary to the former in the households where they lived, or 133 of the total 280 cases recorded, for even if the attack was only postponed, some at least of

[3] Weygandt, W.: Psychiatr-Neur. Woch., 1935, xxxvii., 619; Lichter, Ch., et Lichter, N.: Vol. Jubilaire en l'honneur de Parhon, 1934, p. 281.
[4] See, for example, Amer. Jour. Pub. Health, 1936, xxvi., 8.
[5] M.M.F. Quarterly, October, 1935, p. 366; January and April, 1936, pp. 81 and 180.

the children's lives would be saved by this delay. This proportion is not to be despised. Certainly in such an area the school appears to be the most hopeful point of attack.

BENEVOLENT HOSTS

ON Wednesday of last week many of the officers and subscribers of the Royal Medical Benevolent Fund were entertained by the Royal Society of Medicine. Sir Thomas Barlow, president of the Fund, assisted Dr. Robert Hutchison, president of the Society, in bidding the guests welcome, and not far off was Sir D'Arcy Power, chairman of the management committee of the Fund. They would be grudging guests who required more than the pleasure of the company of such hosts, but the reception was followed by a variety entertainment which Sir Thomas Barlow described as unique in his experience. The sleight of hand was marvellous, and the transference of treasure may have been emblematic of the intention to charm handsome gifts from willing subscribers. Had this not been the object of the reception many of the guests might have felt uneasy at the contrast between the comforts showered on them and the discomforts set out movingly in Sir Thomas Barlow's centenary record and appeal. "Many doctors who are zealous, unremitting and effective in the serious illnesses of poor people are very hardworked indeed. The expectancy of life of a busy practitioner amongst the poor is not a long one." The sentences are taken from this appeal which, with Sir Thomas's own starting contribution of £1000, has reached nearly £3000, but is still far remote from the £20,000 which it is hoped to raise from new subscribers, apart from the special donations wanted for urgent and distressing cases and especially for the training of orphans to be self-supporting. Dr. Hutchison, although as is proper in a host he made no appeal, did make it clear enough that the success of the centenary year would gladden Sir Thomas Barlow's heart and set a seal on his work. We commend his words to any whose names are not yet to be found in the list of subscribers for the year 1935, and remind those whose names are there to add the little more which would make all the difference to some individual case of hardship.

ANNOTATIONS

VIRUS-TUMOURS AND TAR

FACTS now coming to light concerning virus-tumours and chemically induced tumours in mammals and birds must cause us to consider more and more closely whether the gap between two schools of thought in cancer research is not an entirely imaginary one. The first definite evidence that carcinogenic chemicals and viruses might act in concert in causing tumours came from McIntosh's report[1] that three tar-induced sarcomata in fowls had proved transmissible in series with cell-free filtrates, the agent in the filtrates behaving like a virus. More recently, Parsons at the Royal Cancer Hospital has described a sarcoma accompanied by leukæmia in a mouse treated with a soluble dibenzanthracene compound; this, it is reported,[2] has been successfully filtered on four occasions.

Now comes more startling news from Peyton Rous's laboratory.[3] Rabbits tarred on the ear began to show hyperplasia and small warts in 1½–3 months. Ordinarily such warts regress if the tarring is stopped at this stage; to obtain cancers it is necessary to tar for a year or more and even then they will appear in only a minority of animals. Rous and Kidd took rabbits tarred for a short time and inoculated them intravenously with large amounts of filtrates of the Shope rabbit papilloma. After a fortnight, the normal incubation period of this virus, the growths in many rabbits underwent an extraordinary change, becoming discoid and infiltrative within a few days. Biopsies showed that numerous discrete, highly anaplastic carcinomas had appeared. Some of these developed on the basis of pre-existing tar warts, but others where none had been visible. In one instance an anaplastic cancer appeared within 22 days after the virus inoculation. The changes were progressive and usually led to the death of the rabbits within a few weeks. Rous and Kidd have failed to find any previous record of fulminant carcinosis such as this, and nothing of the sort appeared in their numerous control animals.

It will be recalled that the Shope papilloma virus inoculated on to the skin of domestic rabbits produces warts which at first appear quite benign, but after some months may develop into metastasising epitheliomata.[4] The precancerous (papillomatous) period can be shortened in various ways, as by bacterial infection or injection of Scharlach R., but in the latest experiments it appears to have been abolished altogether. Few would have prophesied that the papilloma virus, which induces cancers only after several months, would, when combined with an agent having an even longer period of induction, let loose a fulminant carcinoma in a few weeks. The result is especially suggestive, since previous attempts to obtain tumours quickly by combining several chemical carcinogenic agents have failed. An attempt to interpret these findings would be premature, but it is clear that a field of research of enormous interest has been opened up.

[1] McIntosh, J.: Brit. Jour. Exp. Path., 1933, xiv., 422.
[2] Parsons, L. D.: Brit. Emp. Cancer Campaign, Ann. Rep. for 1935, p. 17.
[3] Rous, P., and Kidd, J. G.: Science, 1936, lxxxiii., 468.
[4] Rous, P., and Beard, J. W.: Jour. Exp. Med., 1935, lxii., 523.

CORAMINE AS AN ANTIDOTE TO THE BARBITURATES

THE great efficacy of Coramine as a stimulant to respiration has been recognised for some years. It was recently discussed at a meeting of the section of therapeutics and pharmacology of the Royal Society of Medicine,[5] where, though a little doubt was thrown on its value, the majority expressed their faith in the drug, and some described excellent results obtained from its use in all conditions associated with shock and depressed circulatory and respiratory states. Anæsthetists have often used injections of the drug to improve the breathing when it has shown signs of failing or has actually stopped. This action of coramine has been taken advantage of especially in connexion with depression of respiration arising after

[5] THE LANCET, 1935, ii., 1122.

the use of basal narcotics. An interesting series of clinical experiments is described [6] by Dr. P. G. Schube, which shows the remarkable power possessed by coramine of counteracting the effects of barbiturates. It is not merely the increased depth and frequency of respiration and improved circulation which follow the administration of coramine, but also the extraordinary cutting-short of the unconsciousness that had been induced by large amounts of barbiturate. The opportunity to test these results arose in the psychiatric clinic of the Boston State Hospital, the patients being all "mentally ill but physically normal." Tests were carried out on 84 patients, the controls receiving barbiturate but no coramine. In the other patients the coramine was given intravenously 5 c.cm. first, and if consciousness had not returned at the end of ten minutes another 5 c.cm. every ten minutes until the patient was conscious. It is stated that in each instance when coramine was injected "the state of unconsciousness was abolished, some persons having to receive more coramine than others to achieve this result." In the controls, unconsciousness lasted for hours longer than in those that had had coramine, in whom it was only a matter of minutes. It is notable that in all these patients the pulse-rate and volume were unaltered although respirations were increased both in rate and in depth. Some of the patients vomited after 10 c.cm. of coramine had been injected. There were no after-effects, and the author concludes that "coramine is an excellent drug to counteract effects produced by barbiturates."

MEGALOCYTIC ANÆMIA IN BRITISH GUIANA

IN 1904 Kennard described [7] an acute anæmia of a pernicious type affecting East Indians in British Guiana; it was seen in both sexes but was definitely more prevalent in pregnant women. This work received little notice for thirty years, but its accuracy has now been confirmed by Giglioli [8] in an important and detailed study of megalocytic anæmia in British Guiana. In a period of twenty months Giglioli found no less than 51 cases of megalocytic anæmia in an aggregate population of 4127 persons. It was commoner in females, the ratio among adults being 5·5 females to 1 male. The age-incidence varied from 11 to 44 years, the majority of the patients being between 17 and 30 years old. Among the women the most characteristic feature in the history was the occurrence of previous attacks in association with pregnancy. The symptomatology was similar to that of Addisonian pernicious anæmia except that nervous complications were not seen. Glossitis and stomatitis were frequent. Splenomegaly was considerably greater than that found in other forms of megalocytic anæmia or in local cases of malaria. The anæmia was usually severe, the red cells being as a rule below 2,500,000 per c.mm. The true colour-index was difficult to assess owing to the method of hæmoglobin estimation used, but Giglioli considers it was high in most of the cases. Red cell size as measured by halometer technique was increased. The indirect van den Bergh reaction was always higher than normal. The anæmia responded in a classical way to treatment either with liver extract or with Marmite. Pregnant women if appropriately treated rapidly recovered and went to term normally, delivering strong and healthy infants. All the males, though they showed a greater tendency to relapse, also made good recoveries. Before its recognition and treatment this grave anæmia is thought to have been the main cause of maternal and neonatal mortality and stillbirth in the district under investigation, since over a third of the infant mortality during the last twenty years has been registered as due to prematurity and congenital debility—i.e., to maternal disease. Apart from its obvious social and economic importance, however, this study raises interesting problems for the hæmatologist. Discussing the ætiology of the anæmia and its relationship to the tropical megalocytic anæmia of India, Giglioli concludes that ankylostomiasis is not an ætiological factor. The local distribution does, however, seem to be related to that of malaria, and he believes therefore that malaria plays a part in the development of the anæmia. It is possible that the associated malaria may explain the constant finding of an indirect van den Bergh reaction above normal which appears to be a striking point of differentiation from the anæmia of a similar type in India. No data concerning the diet or gastric secretion are yet available. The fact that the anæmia responds so well to marmite suggests that a dietary deficiency, associated with the additional demands of pregnancy, has a good deal to do with its development.

[6] New Eng. Jour. Med., May 7th, 1936, p. 925.
[7] Kennard, C. P. (quoted by Giglioli): Brit. Guiana Med. Ann., 1904.
[8] Giglioli, G.: Report of the Surgeon-General of British Guiana, 1934, Appendix II. (B).

VOLKMANN'S ISCHÆMIC CONTRACTURE

THE grave changes in muscle from impairment of blood-supply following on a fractured bone were first described by Rich. v. Volkmann (1830–89). Here this ischæmic contracture is most often seen as a complication of supracondylar fracture of the humerus in children. In considering its cause and treatment Meyerding [1] endeavours to define the responsibilities of the surgeon. Tight splinting of swollen elbows cannot be too severely criticised, and the danger of very acute flexion is well known, but it is not so generally recognised, he says, that it is possible for ischæmic paralysis to come on where no treatment at all has been given. The medico-legal importance of this is obvious: in fairness it is the first point that should be laid before a jury trying such a case in a court of law. The surgeon is wise who mentions the chance of ischæmic contracture before attending to any injury to the elbow-joint, especially if treatment has been delayed. Otherwise there is more than a possibility that all complications will be directly attributed to his treatment and to that alone. A few hours of impaired circulation is, after all, sufficient for damage of muscle. Restoration of the circulation in the limb should therefore be at least as anxious a care of the surgeon as the reduction of the fracture. Meyerding mentions in particular the repeated observation of the radial pulse and of the colour of the hand in the period following reduction. Severe pain is a danger signal; parents should be told of this, and also of the value of testing the active movements of fingers as evidence of good circulation in the hand. It is not always appreciated that even in cases treated early the effusion—and therefore the danger to the circulation of the limb—may develop after reduction. Meyerding found that there was malunion in 40 per cent. of cases of ischæmic contracture. He believes that often in the attempts to relieve pressure the bone ends again become displaced. He also suggests that patients with very swollen, cyanotic arms would be

[1] Meyerding, H. W.: Jour. Amer. Med. Assoc., April 4th, 1936, p. 1139.

much more suitably treated in bed with the arm abducted than walking about with the arm dependent. Elevation of the elbow on pillows or the use of an aeroplane splint are both useful measures.

If the circulation is already impaired when the child first comes under observation, Meyerding advises treating the fracture as of secondary importance and leaving reduction until the pressure has been relieved. There is one criticism of this advice: the pressure may be largely a direct result of stretching the soft tissues over the sharp lower end of the humerus, and accurate reduction will relieve it. In a case of this nature the dangers to the patient and to the reputation of the surgeon are great, and consultation is often wise, because whether the decision is to watch the case (first removing all splints and bandages), to manipulate, or to remove clot and relieve pressure by open operation, there is a very good chance that the surgeon will bear the blame for any subsequent disability. Meyerding advises watching for about an hour, having removed all external pressure, with the elbow extended to more than a right angle and elevated. If the radial pulse is not restored and the swelling increases, he operates, incising freely over the hæmatoma and through the deep fascia. The bicipital fascia may be divided by an incision medial to the biceps tendon, and through this incision the artery is inspected to detect continued bleeding and the nerves are examined for damage. A Kirschner wire passed through the lower fragment he finds useful as an aid to reduction of the fracture.

In the fully developed deformity, Meyerding has obtained the best results by the gradual extension methods described by the late Sir Robert Jones. Wooden tongue depressors are used to splint the individual fingers, the length of the splints being increased as it becomes possible to extend the more proximal joints. Eventually the splints pass from the fingers up the back of the forearm. Active use of the joints is encouraged throughout. Open operation on the flexor tendons, with partial incision and stretching, has given some good results in bad cases, but in the presence of much degeneration of muscles and tendons shortening of the bones is advocated. Meyerding's paper is based on observations and records of 69 cases. He concludes that prevention is possible in many cases if the injury comes under treatment early, but that once the circulation is impaired to any extent, it may be impossible entirely to avert the danger, while in the presence of definite ischæmic contracture it is a mistake to expect very much from surgery.

A BINAURAL HEARING AID

FOR those deaf people who will consent to carry with them a box containing the apparatus, and are sufficiently deaf to need a powerful instrument, the valve-amplifier type of electric hearing aid is the most efficient. This apparatus reproduces sounds with great fidelity and over a wide range of tones, to which the smaller "portable" electric aids cannot attain, thus making speech far more intelligible. But all monaural aids are necessarily non-directional, and are accompanied by some reverberation which tends to confuse the hearing. These defects are not abolished merely by the use of two earphones, but it has been found by experiment that they can be surmounted by providing two entirely separate microphone-amplifier-earphone channels for the two ears. Amplivox Ltd., of 106, George-street, Portman-square, London, W.1, have produced such an instrument, in which the microphones, of piezo-electric type, are placed at an angle of 90 degrees to each other and about 9 inches apart. The case contains six midget valves with H.T. and L.T. batteries and is wonderfully compact, for it measures only $12 \times 3\frac{3}{4} \times 4\frac{1}{2}$ inches. The 2-volt accumulator gives 20 hours' service on a charge, and the dry H.T. battery has a life of about two months. The price of the instrument is 30 guineas. The directional effect is very noticeable at ordinary distances in a room; there is less confusion from reverberation, and a general improvement in naturalness as compared with the monaural instruments. It will be particularly useful in office and board-room to those severely deaf people who require the most natural reproduction of sound at present attainable, but it is a transportable rather than, in the ordinary sense of the word, a portable machine.

THE LISTER INSTITUTE

THE question whether an institute devoted to medical research should or should not be closely associated with a hospital is one which has long been and will long continue to be debated inconclusively whenever two or three doctors are gathered together. The main arguments used on either side are easy to construct. One contends that unless the staff are stimulated by contact with clinical material and by the requisitions made to them daily by physicians and surgeons their outlook will become academic and they may spend their lives studying problems which have no practical bearing; on the other side it is held that the work of the staff of a pathological institute attached to a hospital tends to become ancillary to that of the clinicians, whose demands on their time and attention are irresistible when made in the name of sick people. Such discussions seldom remain abstract; they usually degenerate into an animated game of attack and defence of institutes alleged to have become permanently unfertile; of others whose recovery from lethargy dated from the clinical application of a discovery incidental to an unproductive line of work; of routine workers whose contribution to medical knowledge could only have been made as the outcome of hospital experience; and of occasions where the obstinate conservatism of the general practitioner was eventually justified by evidence rehabilitating a discredited remedy. In the end there is usually an admission that however fully the observational method is exploited in medical research there is still and will always be scope, even from the utilitarian point of view, for the institute where workers are free to pursue experimental investigations without direct relevance to patients, since none can know when any scrap of knowledge fitted to another will bear fruit. These reflections arise out of a study of this year's report of the governing body of the Lister Institute. Here is an organisation whose recent activities, to say nothing of the past, have had a profound effect on modern medicine; for example, the investigations into the morphology of viruses by the present director, Prof. J. C. G. Ledingham; the nutrition studies of Sir Charles Martin, Harriette Chick, E. M. Hume, and S. S. Zilva; the pioneer work on antigenic structure of bacteria by J. A. Arkwright and A. Felix; and the studies of phosphate metabolism and the calcification of animal tissues by R. Robison and his colleagues. There can be little doubt that at any rate in a town as large as London there is room for an institute in which the staff are quite unhampered by routine duties. When the need arises for coöperation with clinical colleagues,

as in the development of the work on the ætiology of rheumatism noted on p. 1435, it is easily secured. Meanwhile the Lister Institute and its younger sister, the National Institute for Medical Research, Hampstead, have a special function in enlisting the help of those trained in more exact sciences in the solution of medical problems.

OCCUPATIONAL SELECTION

THE latest report [1] of the Industrial Health Research Board should be read in conjunction with the article by Squadron-Leader R. H. Stanbridge which appears on p. 1426 of our present issue. Both bear witness to the value of psychological tests in occupational selection. Squadron-Leader Stanbridge's work will no doubt be more easily comprehended by the general reader than that of the Industrial Health Research Board's investigators, since it is far less technical and concerns a more limited problem. But a comparison between them is of value, because they have employed similar tests; indeed, the same linguistic intelligence test—the National Institute of Industrial Psychology's group test 33—was used in both researches. In each, the value of this particular intelligence test was clearly confirmed, and in each the value of tests of mechanical aptitude (derived, it would seem, from tests devised by Dr. J. W. Cox, research fellow of the National Institute) was upheld. Neither research adds very greatly to information already available about mechanical aptitude, but the Board's investigators find themselves able to lend support to Dr. Cox's thesis that a specific mechanical aptitude exists independently of general intelligence, although functioning in conjunction with it. It is perhaps a little unfortunate that Mr. Farmer and Mr. Chambers chose to follow up their statement of this conclusion with the obscure generalisation that this mechanical factor "is involved in tests depending on manual or reasoned reactions to perceptual imagery."

The male workers who made up the fourteen groups tested by the Board's investigators varied in age between 14 and 38¼, and there were 2731 of them altogether. Some were apprenticed to skilled types of engineering; some were engaged in simple upholstering work involving much repetition; some were employed in repetitive light casting; some were being taught to drive and repair heavy lorries and tanks; some were training for various manual trades; and some were being given instruction in visual and auditory signalling. From their study of this material Mr. Farmer and Mr. Chambers conclude: (1) Intelligence tests could with advantage be adopted in the selection of candidates for highly skilled work; or for work which may appear highly skilled to those likely to be employed, on account of their relatively low level of intelligence. (2) Intelligence tests appear to have no selective value where the occupation is of a routine type of a simple kind. (3) The argument that performance tests of intelligence are more appropriate than linguistic intelligence tests for vocational selection in low-grade groups is not supported by the data available. (4) The National Institute's form relations test appears to have considerable value as an aid in selecting candidates for occupations which involve visual perception of form in a static field, but it does not seem to be satisfactory for occupations which involve visual perception in a moving field. (5) The failure of certain tests which were chosen because they *appeared* to involve processes involved in certain of the occupations dealt with serves as a warning to constructors and users of tests of this "analogous" type. Before selection tests are used for practical purposes their validity should be clearly established. (6) The evidence obtained from following the after-careers of certain of the skilled engineering groups is opposed to the frequently made suggestion that psychological tests have prognostic value only during the learning process. On the contrary, it shows that such tests correlate more closely with proficiency when maturity has been reached than with proficiency at the end of the learning period.

Squadron-Leader Stanbridge has provided us with an interesting set of data concerning approximately 1100 aircraft apprentices, between the ages of 15 and 17. His findings lead him to suggest with considerable confidence that the tests he found most valuable—the intelligence and mechanical tests—should be used as supplements to the ordinary scholastic examination which is given to applicants for Royal Air Force aircraft apprenticeships. His results do not encourage him to place any great trust in the "perseveration" test he employed. This conclusion seems to be in line with the general scepticism with which such bodies as the National Institute now tend to regard so-called perseveration tests. Vocational psychologists will read both the report and the article with lively appreciation. Some of them will perhaps feel a little envious of the opportunities in the Royal Air Force for carrying out research work of this kind.

[1] The Prognostic Value of Some Psychological Tests. By E. Farmer and E. G. Chambers. Report No. 74. Pp. 41. 9d

THE EXOPHTHALMOS OF GRAVES'S DISEASE

THERE is something peculiarly fascinating about the unsolved problem of the mechanism of exophthalmos in exophthalmic goitre. Dr. Russell Brain, who has been interested in it for years, devotes the greater part of a recent address, on Some Problems of Thyrotoxicosis,[1] to facts and speculations that bear on it. He regards a rise of pressure in the conical space behind the eyeball, bounded by the rectus muscles, as the probable immediate cause of the protrusion, and he attributes this pressure rise to contraction of strands of smooth muscle acting directly on the eyeball, and also indirectly by constricting the retro-ocular veins and causing their engorgement. He then looks for a stimulus which would make the orbital smooth muscle contract. It is not the sympathetic nerve-supply, for division of this is without effect on exophthalmos, nor is it the thyroid over-activity, for the most that thyroxine can be shown to do is to sensitise the smooth muscle or the nerve-endings to the action of certain drugs. But a number of workers have recently shown that the thyrotropic hormone of the pituitary will induce exophthalmos as well as hyperthyroidism in animals, and indeed will induce exophthalmos in thyroidectomised animals. "It is a tempting hypothesis," Dr. Brain writes, "that this . . . may be concerned in the pathogenesis of exophthalmic goitre," and most of us will be tempted with him. But in yielding, we must not dismiss the sympathetic too summarily, for the hormone produces its effect in animals only if the sympathetic is intact, and therefore presumably should act in man in some way through the sympathetic. Failure of cervical ganglionectomy to abolish established exophthalmos, however, does not necessarily upset this theory, for the common persistence of exophthalmos after the subsidence of hyperthyroidism has long suggested that the physiological

[1] London Hosp. Gaz., April–May, 1936, Clin. Suppl.

changes which evoke it are succeeded by irreversible anatomical changes—such as fat accumulation—which maintain it.

If exophthalmos is difficult to explain, external ophthalmoplegia associated with exophthalmic goitre is still more mysterious. It is uncommon. Dr. Brain attributes the first record of it to Dr. Francis Warner of the London Hospital in 1882, and he himself has collected 22 cases which he presented to last year's International Neurological Congress. Because he finds the ophthalmoplegic complication rather often in male patients and almost always in middle life, and because the accompanying hyperthyroidism is often mild and occasionally extinct, he regards the whole syndrome as distinct both from "primary" exophthalmic goitre and from so-called "toxic adenoma" of the thyroid. This is perhaps straining the argument rather far, but, since the ophthalmoplegia when it does occur is closely parallel to the exophthalmos both in its degree and in its incidence in one or both eyes, it may readily be conceded that both ophthalmoplegia and exophthalmos demand a causal explanation other than hyperthyroidism. The ophthalmoplegia need not be due to a central lesion; it may be a local lesion of the muscles or their nerves, produced like the exophthalmos by pressure changes in the vessels and fluid contents of the orbit. This brings us back to the pituitary hypothesis, and the animal experiments suggesting that thyrotropic hormone can act through the sympathetic on the orbital contents—clearly the most inviting point of attack for those who would investigate further the problem of the pathogenesis of exophthalmic goitre.

IONISATION FOR HAY-FEVER

ZINC ionisation as a method of relieving hay-fever came into prominence last Saturday when the newspapers announced that it has proved successful in 99 per cent. of cases treated at St. George's Hospital. The procedure is to pack the nasal cavities with cotton-wool or gauze soaked in zinc sulphate solution, insert electrodes into the nose, and then pass an electric current, through the solution, to an indifferent electrode applied to the forearm. The result aimed at is a shrunken mucous membrane which will be insensitive to pollen and other stimulants of rhinorrhœa. The steps taken to achieve this object are described in greater detail by Dr. Clive Shields, of the physiotherapy department at St. George's, in the May number of the *Practitioner*. Broadly speaking he follows the technique employed by Philip Franklin for many years,[1] but he packs the nose with ½-inch ribbon gauze instead of cotton-wool and unless the nose is supersensitive uses 2 per cent. zinc sulphate solution rather than 1 per cent. The nose is previously sprayed with 2 per cent. cocaine, "as otherwise the treatment is extremely uncomfortable for the patient," and since there is usually much sneezing and rhinorrhœa 2–12 hours later a sedative is often advisable. Dr. Shields finds that most patients with seasonal hay-fever are free from attacks for about a year after three or four treatments. "Two prophylactic treatments should be given yearly for the next two years and may then be safely omitted. Some cases relapse, but it seems probable from cases observed since 1931 that the attacks respond to one or two further treatments." Mr. Franklin, with his longer experience, is not quite so confident, as will be seen from his letter on p. 1442. Though the use of ionisation for this purpose finds many advocates in the United States and is clearly worth a trial when a person is seriously disabled by hay-fever, it is evidently not appropriate for slight cases that can be relieved by simpler means. Dr. Shields thinks it useless to attempt the treatment in the presence of dental sepsis, infection of the paranasal sinuses, and obstruction to the nasal passages from organic causes such as deflected septum, enlarged turbinates, and polypi. But even if the patient is lucky enough to start with a clean sheet in these respects the final issue cannot, we understand, be foretold with complete confidence. A result which is certainly to be avoided is the inadvertent destruction of olfactory function, and with this in mind the patient should sit up, and not lie down, while the ionisation is in progress.

[1] Brit. Med. Jour., 1931, i., 1115.

TISSUE CULTURE IN STUDY OF THE VITAMINS

A SOMEWHAT new approach to the study of vitamin deficiency was opened when Sir Robert McCarrison and G. Sankaran [1] at the nutrition research laboratories of the Indian Research Fund Association at Coonoor, noticed that cultures of embryonic tissues grew much better in plasma from normal animals than in plasma from fowls with beri-beri, suffering from deficiency of vitamin B_1. The work has now been carried further by Sankaran in conjunction with McCarrison's successor at the laboratory, Dr. W. R. Aykroyd.[2] It is pointed out that the dietary of the beri-beri pigeons was deficient in vitamin A as well as in vitamin B_1, and this time the growth of embryonic fowl spinal cord and rat cerebral tissue in plasma from fowls and rats suffering from vitamin-A deficiency has been investigated. Three types of plasma were examined: plasma from normally fed animals; plasma from animals on a basal diet deficient in vitamin A; and plasma from animals receiving the basal diet supplemented by cod-liver oil. Examination of the rate of growth of the cultures left no doubt that there was a real difference between the different types of serum. To eliminate all subjective influences, observers judged the cultures in ignorance of their nature. The cultures in deficient plasma always gave poor growth, while those in normal plasma gave good or occasionally medium growth. The plasma from animals on the deficient diet, supplemented, gave an intermediate result. This last observation is in accordance with general experience that the most perfect synthetic diet, "completely" supplemented, usually gives a biological result inferior to that given by a complete normal diet. The cause of the failure of the tissue implants in plasma from A-deficient animals was not established. It may well be that there was an actual deficiency of vitamin A in the serum. The possible relationship of these observations to E. Mellanby's suggestion [3] that the nerve lesions are the primary ones in vitamin-A deficiency, and the epithelial ones secondary, is of considerable interest.

[1] Indian Jour. Med. Research, 1933, xxi., 187; 1934, xxii., 67. [2] Ibid., 1936, xxiii., 929.
[3] Jour. Path. and Bact., 1934, xxxviii., 391.

MEDICAL TOUR IN GERMANY.—In connexion with the Olympic games in Berlin a medical study tour of the universities and spas of Germany has been arranged. The party will leave Berlin on August 17th, arriving in Hamburg on the 30th, and visits will be paid to Dresden, Nuremberg, Rothenburg, Munich, Tübingen, Baden-Baden, Heidelberg, Bad Nauheim, and Wiesbaden. The party will sail down the Rhine from Bieberich to Coblenz, and then make its way by Cologne, Leverkusen, and Bremen to Hamburg. Further information may be had from the Deutsche Gesellschaft für ärztliche Studienreisen, Berlin, N.W.7, Robert Koch-Platz 7.

PROGNOSIS

A Series of Signed Articles contributed by invitation

CIV.—PROGNOSIS OF HAND INFECTIONS

(*Concluded from p. 1370*)

Paronychia

This is a special variety of whitlow in which pus appears at the base of the nail. It is important to realise that the pus is primarily situated under the proximal part of the nail. For this reason a curved incision through the skin is useless, as it never reaches the site of the pus. The common operation of removal of the nail is likewise unsatisfactory, as there remains a flap of skin at the proximal end under which suppuration still continues, and healing is uncommon under six to eight weeks. A flap of skin must be turned back so as to expose the base of the nail, which is then removed with scissors, without sacrificing the exposed portion. The flap is held back with a strip of vaselined gauze (which does not obstruct drainage) until suppuration has ceased. Healing can be expected in ten to fourteen days.

Lymphangitis

Lymphangitis is readily diagnosed by the presence of diffuse œdematous swelling, with little or no local suppuration, but with red lines spreading up the arm, and early pain in and swelling of the lymph glands. A state of septicæmia is usually present and dominates the picture, and it is not uncommon for the patient to complain of malaise and fever without remembering a trivial injury to a finger. The illness may take one of the following courses:

1. The patient may pass into a state of profound septicæmia and die within 24 to 48 hours.
2. After a stormy septicæmic illness, with suppuration in the lymph glands and distant metastases, gradual recovery may ensue.
3. After a septicæmic stage and defervescence, local suppuration in the hand may require treatment.
4. After defervescence the condition may clear up entirely without suppuration.

Incision is definitely contra-indicated in the presence of lymphangitis, except late in the disease when local suppuration has established itself. The patient must be treated by absolute rest in bed on a splint, with massive hot compresses to the whole arm, and copious fluids by the mouth. The value of serum is problematical; nor has intravenous chemotherapy proved of great value. In fact the prognosis seems to depend much more upon the virulence of the particular organism in each case. The illness may last from a few days to many months, and while the hand usually recovers completely, permanent damage in distant parts may seriously handicap the patient.

Dorsal Infections.—Carbuncles and Boils

Dorsal infections are less common than infections in other areas of the hand, and are usually due to infected wounds in the neighbourhood of the knuckles. Particular attention should be drawn to the chronic nature of infections following injuries inflicted by teeth (as in street fighting) and those arising from the bites of dogs or cats. A chronic inflammation may last for weeks, even in the absence of gross suppuration. The ease with which the joints become involved in dorsal injuries is also noteworthy, as only a thin extensor expansion intervenes between the skin and the joint cavity. Suppuration in a joint almost always leads to ankylosis, the inconvenience of which has already been stressed.

Boils and carbuncles may occur on the dorsum of the hand and fingers, as in any hairy parts. Resolution is the rule, when treated with cupping and ultra-violet light. Incision should rarely be necessary, and by avoiding it scarring and deformity are reduced to a minimum.

Effect of Infection on the Hand as a Whole

One of the most sinister effects of hand infections is the development of an insidious stiffness of the whole hand when only one part has been diseased. It is sometimes due to the patient's fear of movement, sometimes to prolonged and misapplied splinting, but it may occur in spite of every effort directed to maintain mobility. Persistent œdema is a potent cause. The stiffness may, moreover, take months to overcome, and in the more severe cases is a permanent disability.

It requires nice judgment to determine, in these as in all infections, the correct balance between rest and activity. Absolute rest is essential in the early stages of treatment, but as soon as the local condition is under proper control active and passive movements are to be encouraged. As suppuration diminishes hydrotherapy, radiation, massage, electrotherapy, and occupational movements are of supreme value in restoring function. The preservation of the "position of function" in the early stages assists materially in reducing the time required for this restoration.

Summary and Conclusions

An attempt has been made to indicate the course of each variety of hand infection, the prognosis under proper treatment, and the complications likely to ensue with improper treatment. The prognosis of paronychia, subcuticular and uncomplicated subcutaneous whitlows should be good, with full restoration of function. The prognosis of tendon sheath infections is usually bad, while bone involvement complicating any infection leads to permanent deformity and disability.

The ultimate prognosis must be considered not only from the point of view of subsidence of infection, but from the point of view of return to work and final function. The average period of incapacity from work was 6–8 weeks in a large series of cases, though this figure is somewhat inflated by those cases that have an abnormally long period of incapacity (1–2 years). Three to four weeks is a fair average. This does not take into account cases of permanent disability, nor the fact that the loss of a finger, or the loss of function of a finger frequently necessitates change of occupation, which is in itself a handicap especially to the working man. That the prognosis in general is capable of improvement cannot be doubted, for prophylaxis, early hospitalisation, carefully studied treatment and after-care should materially reduce the dangers of this common condition.

NILS ECKHOFF, M.S., F.R.C.S.,
Assistant Surgeon, Guy's Hospital.

POSTER COMPETITION.—The Great Ormond-street Hospital announces a competition for a poster design to raise money for the reconstruction fund of the institution. Prizes will be £50, £20, and £5.

SPECIAL ARTICLES

THE OCCUPATIONAL SELECTION OF AIRCRAFT APPRENTICES OF THE ROYAL AIR FORCE*

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SQUADRON-LEADER, ROYAL AIR FORCE

THIS paper deals with the use of psychological tests in the selection of personnel. The object of the investigation, which began in 1932, was to find if it was possible to predetermine, more accurately than hitherto, whether a candidate is suitable for acceptance as an aircraft apprentice; and, if so, the nature of employment most appropriate to his abilities and character. Also to obtain a greater knowledge of him—as an individual—than can be got from the results of a written examination.

An aircraft apprentice is a boy who enters the Service between the ages of 15 and 17, is allocated immediately one or other of the trades in which there are vacancies, and undergoes a course of training at a training centre. The allocation of his trade is made in accordance with his parents' choice or his expressed desire, but this is of course subject to many factors, such as Service requirements and his placing at the scholastic examination prior to entry. The course of training is very thorough, lasting three years, and takes into consideration the requirements not only of the Service, but also of his eventual return to civil life. It was a matter of experience that such factors as those mentioned (the requirements of the Service, and parents' choice of trade) were not of themselves certain to prevent the placing of square pegs in round holes, and this was an additional reason for our endeavour to find some form of supplementary examination which would give more information about capacities and incapacities.

The factors operating to produce misfits are many, amongst them being:—

(1) Lack of prior knowledge of the requirements and nature of various trades, and of Service life generally.

(2) The inability of the individual to adapt himself to the demands of the Service.

(3) The fact that a low place in the entry examination may result in all vacancies in the desired trades being filled before the boy's turn comes.

(4) The degree of national unemployment, tending to cause boys with no leanings towards the Service to join it.

The effects of unsuitable selection are obvious. They may be summed up as maladaptation to life, and they manifest themselves in such ways as slowness to learn, insubordinate or undisciplined behaviour, and symptoms and signs of worry like neuroses and abnormal conduct. The cost of training an aircraft apprentice is considerable, and it is important to ensure that the State gets the best, or at least a reasonably good, return for this expenditure. Apart from the immediate advantage to the State and to the Service we also have to consider the making of a good citizen who on return to civil life will be fitted to take a worthy place in his selected trade, and—more even than this—the avoidance of unnecessary unhappiness and possibly disaffection.

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GENERAL DESCRIPTION OF THE TESTS EMPLOYED

The method chosen for testing occupational aptitude was based on the principle that a man's behaviour is an expression of his personality as a whole, and that personality is compounded of intellect, temperament, and character. It was thought that much of the objection to psychological examinations may arise from a tendency to draw too many conclusions from the results of an isolated test, and that consequently a combination of psychological tests with a medical examination might take us a step forward. It was therefore decided to collect data for each individual in respect of the following attributes: physique, temperament, character, intelligence, mechanical ability (the actual performance of certain mechanical tests), and mechanical aptitude (answers to written theoretical questions). Then from such data (which were obtained as soon as possible after he had joined the Service) assessments and final classifications were to be made under definite headings such as:—

(1) Poor types (should not have been accepted)—i.e., those likely to be backward or difficult or temperamentally unsuited to Service life.

(2) Those likely to do well, potential cadets, fit for promotion, &c.

(3) For further observation physically.

(4) Should have been given a different trade.

A report giving the names under these headings was then to be forwarded to the command headquarters for filing until the entry had completed the three years' course, when the passing-out categories could be correlated with the original forecasts. The methods employed in this examination will now be explained.

A special record card was prepared to record the data. These are conveniently divided into two divisions: (1) the individual examination, and (2) the collective examinations.

THE INDIVIDUAL EXAMINATION

Interview.—Each boy is interviewed alone in a room designed to make him feel at ease. He is asked for information under the following headings: name; number; age; trade; birthplace; father's occupation; position in family (with notes as to step-relations, if any); previous occupation and/or school; reason for joining the Service; hobbies; games; early medical history as to signs of nervous or abnormal tendencies; general physical and mental background; position in entrance examination; choice of trade; whose choice, whether it was changed, and, if so, whether voluntarily or as a result of his position in the order of merit in the ordinary entrance examinations; if voluntarily, the reasons for the change.

Physical Examination.—Height, weight, chest expansion, dynamometer reading, condition of tonsils, heart, and lungs, 40 mm. test, assessment of psychological type, and measurements for the Wertheimer index.

The *dynamometer* consists of a scale with a handle attached and connected with a base upon which the boy stands, grasping the handle, to which he gives an upward pull from a slightly forward-inclined position. A reading is given which indicates the combined power of lumbar, abdominal, and shoulder muscles; a mean of three pulls is taken, and this

value, divided by the body-weight, gives an index figure. The height of the handle is adjusted for each boy so as to standardise the reading.

The *40 mm. test* is the standard used in the Royal Air Force as an endurance test. A column of mercury has to be sustained in an open U tube at a level of 40 mm. for as long as possible, the pulse-rate being recorded in five-second periods before and throughout the test.

Assessment of Psychological Type.—As is well known, Kretschmer has attempted to correlate physique with character. His principle is that on the one hand the tall, thin, so-called "tubular" man tends to be an introvert and in mental illness to show a particular type of reaction known as schizophrenic (asthenic); whilst the shorter, thickly set more "rounded" type tends to have an extravert temperament and in mental illness to show the manic-depressive reaction type (pyknic). He places a third group midway between these two extremes (athletic). This classification has the disadvantage of depending on the examiner's personal opinion, and Wertheimer has given a more scientific method of measuring physique by which the leg length and then the transverse and sagittal diameters of the chest and the trunk length is measured. By a special formula using the leg lengths as the numerator and the others as the denominator the ratio between the cubic capacity of the trunk and the cubic capacity of the limbs and head and neck is given. The result is a number and the low numbers indicate those of the "rounded" type of physique, the high numbers those at the "tubular" end.

We appreciated that the relationship between physique and personality had not been sufficiently proved to give by itself a measure of temperament, and that there were many factors complicating the issue, but it was thought worth while to include data

FIG. 1.—The Halton chuck test. The instructions are: "The model is a section of what you have to put together. Do not touch the model, but *build up* a copy of it with the pieces provided. Do not wait to be told to start."

obtained from the adolescent boy under these headings, which might, taken with the examination as a whole, throw further light upon this subject.

Mechanical Ability.—Under this heading there are three special tests, two of which are for the measurement of mechanical ability and the third is a sensori-motor test.

TEST 1.—This is termed the Halton test, and it was devised at Halton as the result of observing the nature of the work required in the workshops where the trades of engine fitter and aeroplane rigger are taught. It was considered that if one was asked which were the two abilities of outstanding importance in successful apprenticeship in the Halton workshops the answer would be "the ability to construct from a model and also to read from a plan." The test given is designed to pick out these two abilities. The boy is shown a model which has been

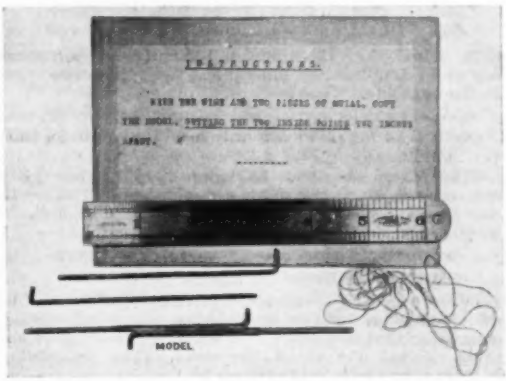

FIG. 2.—Cranwell wiring test. "With the wire and two pieces of metal, copy the model, *getting the two inside points* two inches apart."

sectioned and from this section has to build up the complete model with the parts supplied (Fig. 1). This has to be done in 1¾ minutes and marks are given on the following performance scale:—

No combination	0	4 combinations	4
1 „	1	Complete combination	5
2 combinations	2	Complete combination and inside 1¼ minutes	6
3 „	3		

TEST 2.—This is termed the Cranwell test, and was designed by a similar process as a result of observing the essentials required in successful apprenticeship at Cranwell where instrument-making and wireless telegraphy are taught. This work calls particularly for the ability of fine finger manipulation and for extreme accuracy, and the test consists in copying a model provided by wiring together two pieces of metal the points of which have to be a certain distance apart (Fig. 2). This has to be done in 3 minutes and is marked on the following set scale for wiring, accuracy, and effectiveness.

ACTUAL WIRING

On one piece but bad	0
„ „ good	1
On both but bad (not tight)	2
„ (tight but not close wiring)	3
„ (tight but fair wiring)	4
„ good (tight, no gaps)	5
Good and inside 2 minutes	6

ACCURACY OF MEASUREMENT

Outside 3/16	0	Within 1/16	3
Within 3/16	1	Accurate	4
„ 2/16	2		

TEST 3 is made with the McDougall-Schuster dotting apparatus, and consists in dotting, with a pencil, holes in an irregular pattern on a revolving disc. It was included as a sensori-motor reaction type test.

This completes the individual part of the examination.

THE COLLECTIVE EXAMINATION

In the collective examination any number may be examined at one time. Three tests are given.

1. *Intelligence Test.*—This is the Group 33 standard test, used for adults over the age of 15, which was devised by the National Institute of Psychology. In it there are five tests ranging from a simple test in which pairs of words have to be marked as having the same, opposite, or unknown meaning, to the last test which consists of a number of reasoning problems.

The following examples indicate the nature of the

test, but are generally simpler than those which confront the candidate.

I. *Opposites.* (Time allowed, 3 minutes.)—Fifty pairs of words are given and the candidate (by underlining) has to say whether they have similar, opposite, or unknown meanings. The simple examples are :—

Rich	Poor	SAME	OPPOSITE	UNKNOWN
Big	Large	SAME	OPPOSITE	UNKNOWN

II. *Analogies.* (3 minutes.)—Twenty-five sentences are to be completed by underlining the appropriate word in the next line. Thus :—

GOOD is to BAD as WHITE is to—CLEAN, BLACK, WICKED, RED.
BAKER is to BREAD as TAILOR is to—Tailoress, Cake, Man, Clothes.

III. *Mixed sentences.* (3 minutes.)—There are thirty sentences in which the words are mixed up. The candidate must decide on their proper order and indicate whether the statement is true or false. Examples :—

a roses odour pleasant have TRUE FALSE UNKNOWN
freezes water hot when TRUE FALSE UNKNOWN

IV. *Completing sentences.* (Twenty questions: 10 minutes.)—The task is to underline the word, phrase, or number that makes the best sense, wherever there are three printed one above the other. (The underlining in these examples is left to the reader.)

Monday and Tuesday are { January / Autumn } { months / days } of the week.

The man { fell / rode / climbed } off his bicycle and { cured / broke / changed } his arm.

V. *Reasoning.* (10 minutes.)—Eighteen assorted problems.

This test is designed to measure general mental ability and is a scientific method of estimating inborn capacity. An intelligence test of this sort has the advantage that it cannot be crammed for; the conditions are exactly the same for all candidates; and it consists in different tests designed to bring out native intelligence. No writing is required. It is not suggested that it takes the place of a scholastic test of general knowledge, but rather that it provides a more accurate method of grading candidates from whom a selection is required for a particular purpose.

2. *Mechanical Aptitude Test.*—In this test there are thirteen mechanical problems, ranging from one which consists in arranging some toothed wheels, and connecting-rods and pins, to make a cog revolve in a given direction, to one which involves the estimation of where a given point on a lever will be when an eccentric, which is attached to a shaft connected with the lever, has been given half a turn. As in the intelligence test, no writing is necessary. Alternative answers are printed and it is only necessary to underline the correct one. This has the advantage of standardising these tests and eliminating differences due to speed of writing, &c.

3. *Perseveration Test.*—This was considered to be the most promising of the tests for the assessment of character. The scientific estimation of character is a very difficult problem; but it is certain that there are many variable factors, both conscious and unconscious, in the observer and in the observed which may adversely affect the accuracy of personal assessments and which tend to be affected by personal bias. It would appear that the road to greater fairness and consistency lies in the direction of some set form of test common to all candidates. The test used is based upon the principle of setting up a habit and then breaking it. This is done by giving a set piece of transcription which is to be written as quickly as possible for a definite period, and then repeated for three more periods of the same length of time but with certain variations introduced in each of the last three periods. Thus every *e* has to be turned into an *a*, and vice versa; or a *q* has to be introduced after every *e*; or every letter in every word has to be doubled. This test is based upon work done by Pinard who claimed that it enables an empirical assessment of character to be made. He maintained, for example, that both extreme perseverators and non-perseverators tend to lack perseverance and self-control, and to be unreliable and difficult, whilst the moderate perseverator tends to be considerate, self-controlled, and reliable.

COLLATING THE DATA

This concludes my brief and general description of the actual tests used and the principles upon which they rest. The results are recorded on the front of the record card. This side of the card necessarily consists mainly of numbers, because one object of this scheme is to eliminate the personal factor of the examiner so far as is possible, and that the tests should be common to each candidate and marked by a number depending upon performance timed by a stop-watch, and judged by a set scale of marks.

The next step is to interpret these numbers in terms of poor, below average, average, above average, and exceptional, so that an assessment may be made

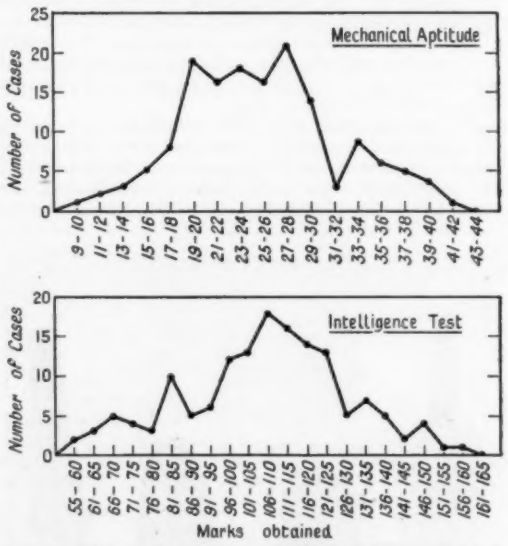

FIG. 3.—Marks obtained in mechanical aptitude and intelligence tests, showing curves approximating to normal frequency curves. For mechanical aptitude the mean is 25·3 marks and the average 19–30; for intelligence the mean is 106·3 and the average 95–124.

on the back of the card for easy reference. This is done by plotting out performance marks against the number of boys scoring each mark in each entry, and the result is, broadly speaking, a normal frequency curve, with equal falls above and below a general average (Fig. 3). The production of such a curve in the results of marking these tests is an indication of the soundness of the method adopted.

We are now, therefore, prepared to turn over our record card and consider the assessment of these results. The headings under which these are made are as follows :—

Physical.—Based upon the psychological type, physical index, 40 mm. test, and any special physical characteristics. It has been possible as a result of data obtained

to suggest a grading scheme which may assist in the selection of athletes and in the regulation of their training.

Character.—Based upon the early history and background, body type, temperament assessment, and perseveration test.

Mechanical ability = (Halton, Cranwell, and dotting tests). *Mechanical aptitude* = The thirteen mechanical problems in the paper test. *Intelligence* = The five tests in the paper. Under each of these headings the numbers already obtained are transposed into categories derived from the graphs (Fig. 3).

Trade most suited for.—Based mainly upon hobbies; reason for joining the Service and reason for wanting a particular trade; and performance in the special tests.

Leadership qualities.—Based upon a review of all the facts.

Tendencies.—(*a*) Physical. (*b*) Temperamental.

Such *general indications* as, for example, that further observations on medical grounds is needed, or that it is considered possible that the boy may break down and develop neurotic symptoms, are noted here.

After considering the whole of the above information the candidate is placed in one of the following categories, different colours for each category being painted at the foot of the card for easy reference :—

(1) Those who should do well, and suited for promotion or for cadetships.

(2) Those who are unlikely to do well, may be difficult or backward due either to inability to learn a trade, or temperamentally unsuited for Service life.

(3) Those who should have had a different trade.

(4) Those needing further observation on physical grounds.

This completes the forecast, and the rest of the card is left for the recording later of his actual progress in his squadron, schools, and workshops, together with any special performance on the playing fields, or any special activity. This last section of the card records the marks scored in examinations for practical and theoretical work in workshops, and in schools, and the final trade category awarded him in his final passing-out examination conducted in workshops by the Trade Test Board. Distinctions such as the special award of a prize, or recommendation for cadetship, are also noted.

RESULTS

So much for the general outline of the principles and methods of this investigation. What can be said of the result of it all?

Since September, 1932, a total of some 1100 examinations have been made, and two complete entries of apprentices—namely, those joining in September, 1932, and in January, 1933—have completed their three-year courses and have passed out as trained mechanics to appointments in squadrons, &c. The Medical Research Council has therefore been able to make a statistical analysis of the results in connexion with these two entries. I do not propose to go into this in detail, but it is possible to summarise the conclusions briefly.

The method was to take the three main groups of assessments given under the headings: (A) those noted to do well, including potential cadets; (B) those noted as being unlikely to do well, including those considered unsuitable for the Service; and (C) others; and to compare them with the three passing-out ranks of: (1) cadets and leading aircraftmen (L.A.C.'s); (2) A.C.1's; and (3) A.C.2's and cases discharged from the Service as being unsuitable. It was found that Class A (likely to do well) contained three times as many cadets and L.A.C.'s as would be expected by chance, and contained no A.C.2's or discharges. Also that Class B (unlikely to do well) contained no cadets or L.A.C.'s, but over twice as many A.C.2's and discharges as would be expected by chance. Moreover, this general tendency was consistent in the two entries, and by averaging these and stating the facts numerically, it is deduced that every thousand boys selected by this method would contain at the end of their training 10 more cadets and L.A.C.'s, 12 more A.C.1's, and 22 fewer A.C.2's and failures than would be the case if the boys were selected in the usual manner. This indicates a raising of the standard throughout.

To state these results in a different manner the Medical Research Council say: "This final assessment has a significant relationship with passing-out which may be illustrated by the following facts. In the September, 1932, entry, 138 boys were trained, and of these 14 became cadets and L.A.C.'s. If these boys had been chosen by this assessment, only 123 boys would have been trained to yield the same number of cadets and L.A.C.'s. In other words, there would have been a saving of 10·9 per cent. in the number of boys trained. Similarly in the January, 1933, entry there would have been a saving of 9·1 per cent. in the number of boys trained. On the average therefore, as judged by these two entries, a saving of 10 per cent. could be effected in the number of boys to be trained in order to yield the same number of boys of the highest rank as are yielded by the usual method of selection.

"Of the tests themselves, intelligence, mechanical aptitude, and mechanical ability were found to be the most valuable, and these combined with the entrance examinations gave a closer relationship with trade proficiency as measured by the final trade test than did the entrance examination alone. These results are statistically significant and have been yielded consistently, so that by all the available evidence there is every reason for putting them into practice and supplementing the entrance examination by these tests. This combined method of selection should pick out a set of boys with an increased number of the higher ranks at the end of their training, and decreased number of failures and unsatisfactory apprentices."

These conclusions are reached as a result of the statistical analysis of the relationship between the assessments made from tests and the actual final performance of the two entries some three years later. The foregoing may be referred to as "positive" results, but some of the "negative" results are interesting. By negative results I mean those tests which have been found not to correlate significantly with the passing out result. Thomas Huxley said "the benefits of Science are derived more from the methods than the product thereof"; in any event these negative results certainly have to be considered.

No relationship was found between the 40 mm. test, nor the physical type classification, nor the dotting test, and the passing-out category. The relationship between the character assessments and passing-out showed that none of those assessed as being "unreliable and lacking in perseverance" became cadets or L.A.C.'s, whilst none of those assessed as being "practical" became A.C.2 or were discharged as inefficient. Whether this assessment is capable of being rendered more significant by some modification of the tests involved is uncertain. The perseveration test alone did not show any relationship with passing-out rank.

As regards the interrelationship between one test and another it was found that there was a significant relationship between the mechanical aptitude test and the intelligence, mechanical ability, and dotting tests. Also that there was a relationship

just significant between the physical type and the 40 mm. mercury test due to the facts that (*a*) none of the "rounded" type (pyknic) were "below average" in the 40 mm. test, and (*b*) more of the middle type (athletic) are "below average" than would be expected by chance. The tests which intercorrelated in this way were the intelligence, mechanical aptitude, mechanical ability, perseveration, dotting, and entrance examinations, and there was no significant interrelationship other than those noted above.

There are one or two further observations to make. One intention of this examination was to attempt to assist the executive branch in a practical manner in selection and training of personnel. It has been possible to do this whilst the examination was in progress and independently of any statistical proof as to results.

For example, the question of selection of cadetships is a very important one both for the Command and for the Service generally. A certain number of names are submitted from each entry, by the Air Officer Commanding, to the Air Ministry as being suitable to proceed to the Royal Air Force Cadet College, Cranwell, to undergo training to become commissioned pilot officers. Six names have been submitted in this way from each of the two entries which have passed out, and which have already been referred to. Whilst these numbers are too small to be treated statistically as a separate class, it is of interest to show that in the case of the September, 1932, entry, five of the six selected were classed previously as having leadership qualities, and as being potential cadets (the sixth being given a practical assessment above the average). Of the six recommended of the January, 1933, entry, four previously were classed as being potential cadets, and as having leadership qualities, and one as likely to do well, and the sixth was given a good practical assessment.

A further example of the uses to which this examination has been put is that it has been found possible to assist the instructors and commanding officers in the backward or difficult cases, particularly in the sort of case where a boy was backward and it was not known whether this was due to inability to learn or to some temperamental difficulty. About 80 special examinations and reports have been made in these cases.

The physical tests employed have been used by trainers to assist them in grading certain athletes, particularly cross-country runners and tug-of-war teams. About 100 examinations of this sort have been carried out.

THE VALUE OF VOCATIONAL TESTS

A recent publication ("The Examination of Examinations") has shaken the confidence of many in the present form of scholastic examination, but it is often asked: "What is there to take its place?" So far as the entrance examination for Royal Air Force apprentices is concerned, I suggest that the answer is given here. It is: supplement the scholastic examination by other tests such as those described. (And it may be observed that such tests hold good for selection for any mechanical employment, and are easily adaptable to the requirements of any particular trade.)

Psychological tests have been compared with thermometers in that they fittingly replace fallible judgment by objective data, and will give constant readings regardless of who uses them. Tests of the sort described in this paper have corresponding advantages over existing methods of personal selection and examination. For example, their exact worth can be measured by mathematical methods; they require no writing, they contain no trick items; they have a standardised procedure and method of marking; no preliminary "swotting" can help; each question admits of only one correct response; specific abilities and capacities may be measured. If I may use the jargon of the financial columns, I do not know whether shareholders will consider that prospects of dividends such as those outlined here will merit a slight variation in capital distribution. But I suggest that psychological tests are to-day moving from the "speculative" into the "investment" category; indeed, the intelligence, mechanical aptitude, and two mechanical ability tests receive enough statistical support in this inquiry to be classed as "trustee stock."

I wish to thank the Air Officer Commanding, Halton Command, and his staff (particularly the principal education officer) for the kind assistance which has been given at every point, and also to thank the Industrial Health Research Board of the Medical Research Council, who have not only provided some of the tests, marked some of them, and carried out the statistical treatment of the whole examination, but also by their general coöperation have made this investigation possible.

PARIS

(FROM OUR OWN CORRESPONDENT)

DECLINE OF BREAST-FEEDING IN THE COUNTRY

THE recent appointment by the Academy of Medicine of a commission to investigate the decline of breast-feeding in France is largely due to the disturbing information collected by Dr. Lesage and Dr. Cruveilhier. They addressed themselves to medical practitioners in the country districts and in towns with a population of less than 5000, and invited not only data but comments thereon. The response was generous, and some 800 doctors answered. The burden of their replies was that faulty infant feeding in the country was the most important factor in the infant mortality, and was traceable to the abandonment of breast-feeding. In Normandy the few mothers who still suckle their babies are not farm workers but factory hands whose employers presumably make special arrangements for them. In another area it is calculated that only 5–10 per cent. of the mothers give their babies the breast, and when they do so it is only for two or three months. A general practitioner with an experience of ten years in his district had not known of a single case of breast-feeding by a farm worker. The explanations offered for this state of affairs by the medical profession are remarkably varied. Some see in it "a sort of moral crisis which rages among the peasants." Others find the mother of to-day jealous of the privileges she learnt to enjoy during the late war. The alleged fear of women to "compromise their æsthetics" is also mentioned as a factor in the case. They are accused of sacrificing breast-feeding to outings, the cinema, the motor-car, and the bicycle. Then there is the overwork for women on farms whence the male labourer has fled. The mothers have, in fact, so little time for eating and sleeping that there is none left for breast-feeding, and the fact that it is commoner in the winter, when there is comparatively little to be done in the fields, than in the summer seems to support this view. Dr. Lesage and Dr. Cruveilhier lay the blame on an evil concatenation of circumstances rather than on any inherent wickedness, beyond the ordinary, in women.

TOO SUCCESSFUL TREATMENT OF A SPRAINED ANKLE

A general practitioner in the North of France, having mastered the by no means complicated treatment of sprains by the injection of novocain into the painful area, was consulted one Saturday by a motor driver who had fallen off a motor lorry and sprained his ankle. He had been able to drive his lorry back to the garage without excessive pain, but after a few hours his sufferings had been such that he had had to seek his doctor, who found slight œdema of one ankle, in which there was lively pain on movement about the joint. A sprain was diagnosed and a certificate to this effect was signed by the doctor with a view to insurance benefit. He then injected novocain locally, having learnt of Prof. René Leriche of Strasbourg what a remarkably effective procedure this is. A few minutes later the patient was no longer a patient—he could walk without pain. Next day, Sunday, he walked about freely, and on Monday morning he returned to work. But the doctor's account was not honoured by its recipient, an insurance society. The refusal to pay was backed by the intimation that the alleged sprain was apocryphal, that there had, assuredly, been no accident, and that its fictitious victim had been seen about on the day of the "accident," walking with perfect freedom. Under these circumstances the doctor's claim for a reward for his successful treatment could not be met, and he must be thankful if he escaped a charge of conspiracy to defraud the insurance society. The matter was referred to Prof. Leriche who willingly testified to the apparently almost miraculous effects of his treatment, and who warned insurance societies that if therapeutic successes were to be the signal for refusals to pay for them, the inducements to enjoy them might wane to the point of their not being wanted by the insured. He also remarked on the lack of psychological insight shown by the insurance society in question, for it is characteristic of the true malingerer that his ailments are refractory to treatment, not that they vanish into thin air in response to a single injection. And if insurance societies persist in their error the insured will prefer the combination of pain and stiffness with compensation to prompt recovery without it. It is wonderful how tolerable the discomforts of a sprained ankle can become if they are mitigated by insurance funds and relaxation by one's own fireside.

TYPHOID FEVER IN FRANCE

In the *Revue d'Hygiène* for May, Prof. G. Dubreuil of Bordeaux reviews the causes of the high typhoid rate in France, and of the measures most likely to reduce it. In 1906 there were 14 notified deaths from typhoid fever per 100,000 inhabitants, and in 1932 the corresponding figure had been reduced to 3·8. But France still enjoys an unenviable reputation in this respect when compared with several other countries, her 3·8 per 100,000 in 1932 comparing badly with 1·2 for Germany in the same year and 0·6 for England in 1933. An instructive feature of Dubreuil's study is his charting of the different French administrative areas according to the level of their typhoid death-rates. This geographical survey throws into lurid relief the coastal districts. Apart from occasional water-borne epidemics, the disease seems to be more or less permanently settled in certain well-defined areas, and the most important of these areas are to be found on the Atlantic and Mediterranean seaboards. The predilection of typhoid fever for the coast is reflected in the mortality returns of the large towns on the coast and inland respectively. Thus Toulon and Bordeaux in the period 1926–31 had typhoid mortalities of 18·2 and 17·4 respectively per 100,000, whereas the corresponding figure for Lyons was 5·6, and for Rheims only 1·9. In France the urban typhoid death-rate is higher than the rural death-rate from the same cause, although urbanisation may often to said to be synonymous with a comparatively pure drinking-water. The explanation of this phenomenon is probably to be found in large part in the comparatively important consumption of shell-fish in the towns. This explanation would also account for the preference shown by the typhoid bacillus for the coastal districts. Man has become fussy over uncooked and unwashed fruit and vegetables, but he remains loyal to uncooked shell-fish; there seems to be veritable desecration in the cooking of an oyster. Dubreuil's remedy for this state of affairs is largely administrative and educational; all concerned with the shell-fish industry should be taught to take the necessary precautions and be weaned of the notion that their hygienically unhampered means of livelihood must be maintained regardless of the welfare of the rest of the community. He concludes with a statement casting doubt on the efficacy of antityphoid inoculation, as at present practised, against infection through shell-fish.

BUDAPEST

(FROM OUR OWN CORRESPONDENT)

THE PREVENTION OF VENEREAL DISEASE

THE Teleia Society, founded in Hungary in 1893 by Profs. Feleky, Temesváry, and Török, claims to have been the first of its kind in Europe. Initially consisting only of an out-patient clinic offering free treatment for venereal disease, it has been stimulated by the great increase in these diseases after the late war to establish dispensaries in several towns and to introduce widespread and effective propaganda throughout the country. Dr. Aladár Emödi, chief physician of the society, has arranged a display of instructive films, which was attended by 150,000 of the public; 500,000 postcards and pamphlets have been distributed among patients. A monthly journal has a circulation of 3000–5000, and 17 booklets have been published. Other antivenereal work is being done by the National Social Insurance Institute and other similar organisations, and the Stephanie National Association helps to provide dispensaries. Much propaganda is spread by the Institute and Museum of Social Hygiene, by frequent exhibitions held in Budapest and in the country, and also by Sunday lectures in the museum. All these measures show that the prevention of venereal diseases is very well supported in Hungary notwithstanding the very grave economical position of the country.

PUBLIC HEALTH IN THE ECONOMIC CRISIS

Dr. Georg Gortvay, director of the Institute and Museum of Social Hygiene, in an elaborate study, has established the fact that the worst period of the economic crisis, 1928–34, resulted in a greatly reduced consumption of staple foods. The reduction in wheat was 13·3 per cent., in potatoes 8·3, sugar 3·0, meat 18·2, and in milk 30·8 per cent. The annual consumption per head in wheat and rye was 253 kilos, potatoes 150 kg., sugar 9 kg., meat 16 k.g, and in milk 14·4 litres (3·2 gallons). The fall in the consumption of staple articles went hand in hand with the deterioration of earning conditions as well as with the increase in the financial burden of the public. The agricultural

wages fell during this period by 40 per cent. It is a distressing symptom and characteristic of the social position of agricultural labourers that their daily food allowance was 12–14 fillér (a penny), when we consider that this small sum is not the equivalent of even a kilogramme of bread, and a labourer needs at least half a kilo a day. Dr. Gortvay established that the nutrition of the rural population is poor in vitamins, and that this is related to the spread of tuberculosis. His investigations show therefore that in relation to the work performed the nutrition is lacking in quantity as well as in quality.

But the nutrition of the rural child population is also deficient. It was established from the analysis of 2600 urban and 2900 rural school-children, that in the country food is monotonous and badly selected; vegetables are absent in the diet of 19 per cent. of the urban and 37 per cent. of the rural children. One would expect the contrary, but the peasants are forced, by the good prices that they get, to sell their vegetables in the town markets. Meat was lacking from the diet of 15 and 31 per cent. of the children in town and country respectively. Another investigation revealed that the rural child has to be satisfied with only one dish at lunch and dinner, usually of potatoes, bean soup, cooked vegetables, or farinaceous food. For breakfast he has a cup of milk, coffee, or tea, a piece of stale bread, or nothing at all; there are again no two-course breakfasts. Industrial labourers spend on food on an average 45 per cent. of their income. Among unemployed workmen, the daily food quota dwindles in direct proportion with the number in the family. Hand in hand with the deterioration in nutrition goes the increase in gastro-intestinal disease. During the period 1928–34 the medical officers of health at Budapest reported a 145 per cent. rise of patients requiring free treatment.

CASE OF GENERALISED PYODERMIA CURED WITH X RAYS

Dr. Haas, senior physician in Csakova, Banat, describes the case of a secondary school student, aged 15, who fell ill with scarlet fever. Although the disease was very severe from the beginning no complications at first emerged. When skin desquamation began, however, there was intense itching, which, on account of the neuropathic constitution of the boy, produced exaggerated scratching. Erythematous and bullous rashes and purulent vesicles appeared, which spread over the whole skin in a few days and displayed the uncommon but characteristic picture of impetiginous eczema and generalised pyodermia. All the drugs that are reputed to be effective in such cases proved futile. The boy had gradually rising fever and became very ill. In the last resort they applied X ray irradiation, which brought a surprisingly quick and prompt healing.

Haas irradiated the anterior and posterior surfaces of the body at two sittings. He used a filter of 1 mm., the dose being 15 erythema doses. The intolerable itching, which caused sleeplessness, ceased after the lapse of 24 hours. Since then Haas has applied small doses of X rays to all kinds of pyogenic dermatoses and to furunculosis, and the results have been just as reassuring.

SALVARSAN TOLERANCE IN EARLY CHILDHOOD

L. Dobszay and A. Bános have found in previous experiments that if infants are given an arsenobenzol preparation intravenously in exactly proportionate doses the arsenic curve of the blood differs from that of adults. In infants about 40 per cent. more arsenic leaves the circulation within the first half hour than in adults. Searching for the cause of this they found that the final elimination of arsenic is identical in both groups, and therefore they had to assume that the arsenic surplus disappears only into the tissues. It may be that diffusion, or the mechanism regulating diffusion, is increased, or that the absorptive power of the tissues is relatively greater in children. The former could not be proved, although very careful tests were made. Nothing therefore remains, say Dobszay and Bános, but to accept the cause of the above difference as a difference in the cumulative power of the tissues, the more so as their investigations proved that the reticulo-endothelial system of infants accumulates the arsenobenzols much more vigorously than in adults, in whom this process is much slower, and it is this that explains the greater tolerance.

NICOTINE POISONING IN AN INFANT

Dr. Irene Greiner has reported a case of nicotine poisoning in a baby of three weeks, the vehicle being the mother's milk, for her daily tobacco consumption amounted to 35–40 cigarettes. The prominent symptoms of the intoxication were restlessness and sleeplessness, very frequent vomiting, severe colic, loss of appetite, and pallor. The animal experiments of Hatscher and Crosby, and numerous tests on lactating women, have revealed that the mammary gland can excrete nicotine. From this it is concluded that it is wise for mothers to give up smoking during lactation, or at least considerably to curtail it.

The lecturers and professors of the Budapest University arranged a well-attended post-graduate course for a fortnight in May. The lectures were held in Hungarian, German, and French. The Hungarian Government allowed to those attending the course a 50 per cent. reduction on all the State railways.

UNITED STATES OF AMERICA

(FROM AN OCCASIONAL CORRESPONDENT)

THE SPRING CONFERENCES

MOST important of medical and scientific conferences to the practising physician is the annual meeting of the American Medical Association. It was held this year at Kansas City and of the 6824 doctors who registered their attendance more than one-third came from the contiguous States of Missouri and Kansas. It is estimated that double the number of registrants were present in the auditorium to hear welcoming speeches from the governors of these two States.

The address of the retiring president to the House of Delegates and that read for the incoming president, whose serious illness prevented his attendance, alike reflected the complacency of the leaders of the profession in this country at the conservation of the status-quo or, to use the words of the retiring president, Dr. James S. McLester, "the preservation, unimpaired, of established methods of practice, methods by which American medicine has reached its present pre-eminent position." The president for this year, in his tour of the country during which he has spoken before some 8000 physicians, has found that the majority of these are "pleased and gratified to hear that the aim of the American Medical Association is to preserve the individual private practice of medicine, with free and open competition among physicians and the maintenance of personal relationship of doctor and patient." Yet beneath this complacency and self-gratulation there are certain symptoms of inquietude. Dr. McLester pointed

out that the disaster which has overtaken our colleagues in England, as elsewhere in Europe, came "at the end of a long series of other so-called social reforms," and that the control by government in this insidious manner of the practice of medicine "once established has never been relaxed." The train of events, the so-called social reforms, which preceded the krankenkassen system in Germany and the panel system in England, is already well started in this country, he pointed out, naming as terrible examples the provisions of the Social Security Act for maternal welfare and for old age pensions. "Will the politicians of the near future," he asked, "anxious to carry government subsidies still further, extend their control, as politicians have already done elsewhere, to medical care?" Now the Social Security Act is the product of a Democratic administration. The Governor of Kansas, on the other hand, is at present the prime favourite for nomination as presidential candidate on the Republican ticket. He showed keen political insight and was rewarded with a stirring political ovation when he declared: "Medicine will not willingly be made the servile instrument of politicians or the instrument of domineering bureaucrats."

It would be entirely unjust to leave the impression that the Kansas City meeting had not also its scientific aspect. In the section on tuberculosis Dr. James Alexander Miller attributed the decline in tuberculosis mortality largely to the development of racial immunity. In other sections were described a new method of removing hitherto inaccessible brain tumours, a new use for "artificial fever" in the treatment of chorea, the use of helium in the treatment of asthma, and so on. A popular educational feature was Dr. De Lee's moving picture of the forceps operation.

Members of the American Psychiatric Association had a short journey from Kansas City to their own convention in St. Louis. They assembled there 1800 strong. Dr. C. O. Cheney, the retiring president, effectually "debunked" the popular theory that insanity results from the stress and strain of modern life. This doctrine he showed was advanced as early as 1734. The new president of the Association is Dr. Macfie Campbell who has been for long a leader in the mental hygiene movement.

The American Laryngological, Rhinological, and Otological Society met at the end of May in Denver, Colorado. Bronchoscopists went from Denver to Detroit for the ninth annual meeting of the American Bronchoscopic Society. No less than seven national associations in different medical specialties are to meet this month.

Important announcements of medical research are not always heard for the first time, however, at physicians' meetings. The American Chemical Society which also met in Kansas City this spring again challenged the propriety of substituting purified derivatives for the original cod-liver oil. Just as this oil was found to contain vitamin D as well as vitamin A, and to be of value for its content in A as well as for its supply of D, so now there is evidence of other important nutritive constituents which have not yet been isolated. The possibility of purifying waters that contain fluoride and cause "mottled enamel" on so many American teeth by the use of aluminium hydroxide is another chemical contribution of importance to public health.

THE NATIONAL LEAGUE OF THE TUBERCULOUS

Some 50,000 cases of advanced pulmonary tuberculosis are discharged from our sanatoria each year Their subsequent fate has aroused hitherto very little interest beyond that of the statisticians who calculate that 52 per cent. of them suffer a relapse and die within two years. No serious attempt is made by any governmental authority to provide working conditions adapted to the working capacity of these discharged patients or to lessen in any other way the probability of relapse and death. Private efforts, such as the work of the Altroshop in New York, though gallant and successful, are small in scope and pitifully few. The challenge of this grave social need has now been taken up by the tuberculous themselves, who have formed a National League of the Tuberculous with headquarters at Woolsey Station, Astoria, New York. Membership dues are $1 per annum which includes subscription to the official organ *The Voice of the Tuberculous*. The League will air the grievances and protect the interests of all who are handicapped with this disease and will urge two specific solutions: (1) the provision of pensions under the Security Act; and (2) the provision of village settlements. The origin of the League is explained in the first number of the *Voice* as follows:—

"Outside organizations, no matter how well-meaning they may be, are an affliction rather than an aid to the tuberculous. Professional sympathizers capitalize on the misfortunes and hardships of the tuberculous in order to raise funds. Their sob-stories and tear-jerking publicity increase hypochondria and the unhealthy and morbid fear of tuberculosis. Whoever has been touched by the disease finds himself stigmatized and marked for exile. He is unemployable because of pity. Employers are afraid he will break down again and become a liability. Fellow workers are afraid they will catch 'consumption' from his presence. And our charitable organizations give him the choice of starvation or the poor farm.

"The tuberculous have learned that their only true friends are their fellow victims. Their only hope for aid in rehabilitation and a normal life is to join hands in a coöperative effort to help each other without depending upon charity or pity. And with this single-minded purpose of forming a national union for coöperative self-help, The National League of the Tuberculous has been organized."

The organisers while nourishing this admirable spirit of independence and self-help are nevertheless willing to accept contributions from well-wishers of their movement.

MEDICINE AND THE LAW

Trespass for Want of Patient's Consent

Mr. Justice Swift's decision last week in O'Shea *v.* Moyce and Donston was a reminder of the risks of operation without the patient's specific consent. The surgeon may often rely upon the understanding, normally an implied condition of the legal relationship of the parties, that the patient gives implied consent to all such actions as professional skill and judgment may deem necessary. It may be possible to obtain beforehand a definite authority in writing for the performance of some named operation; but precise knowledge is not always available and emergencies may occur. An unauthorised operation is technically an assault or trespass. The practitioner runs a risk of a claim for damages.

In Miss O'Shea's case last week it was alleged that a dentist had extracted teeth without permission. She had a broken tooth which disfigured her mouth; it seemed likely that other dental treatment was needed. Her panel doctor examined her mouth and certified that she ought to see a dentist. The defendant dentist recommended that all her 16 upper teeth and two of the lower teeth should be extracted.

According to the judge's findings, Miss O'Shea was upset by this information. She asked whether she really need lose all these teeth and was told that, while they were not all bad and while some could be saved, she would have to come back later and have all the fuss and bother over again unless she had them all out now. She was persuaded, said the judge, by this mention of future fuss and bother and she attended at the defendant's surgery. On the first occasion ten upper teeth were extracted while she was under gas. When she recovered consciousness she complained that another tooth was still aching; the dentist thereupon extracted one more; he told her that further teeth were still to be removed. At the end of this first visit, said the judge, nothing had happened to which Miss O'Shea had not assented. But afterwards she said that, though one or two teeth might have needed stopping or taking out, the wholesale clearance was quite unnecessary. She had accepted his advice but the advice was negligent. A week later she paid her second visit for the removal of the teeth not previously extracted. On this occasion, Mr. Justice Swift held, no fresh advice was given her and no fresh consent obtained; the remaining teeth in the upper jaw and the two teeth in the lower jaw were to be taken out. But when she recovered consciousness, she found that all the teeth on the right side of the lower jaw had been removed. For this, in the opinion of the court, there was no justification. There had been ample opportunity for the dentist to come to the conclusion that all these teeth should come out. He could have asked the patient or her mother before giving the gas; he could have waited till the patient recovered consciousness. "To go and take out all those teeth without a word and without asking permission" his Lordship considered to be a trespass such as entitled Miss O'Shea to damages. The patient told her mother and they went back to the dentist who explained that the teeth had been pyorrhetic. The judge accepted the evidence given on behalf of the plaintiff that Miss O'Shea's mouth had shown no signs of pyorrhœa. He considered she had been improperly advised about her upper teeth and had suffered a trespass in the removal of her lower teeth without her consent. He gave judgment in her favour for £250.

The legal doctrine of the patient's implied consent, therefore, did not cover the case of professional treatment involving pain and permanent disability. It was the practitioner's duty to furnish the patient with information of the proposed action and with the opportunity to give or refuse consent. Mr. Justice Swift's decision suggests that in dental practice no such emergency is likely to arise as would relieve the practitioner of his duty to obtain the patient's consent beforehand. The dentist who assumes that he has been given a free hand to do his best may find that the law regards him merely as a trespasser.

What is Lysol Soap?

How much lysol should there be in a substance sold as "lysol soap"? In Stott *v.* Green and Stott *v.* Henshaw last month the Salford stipendiary had refused to convict the retailer of "medicated lysol soap" which contained only 0·1 per cent. of lysol. Proceedings had been taken under Section 2 (1) of the Merchandise Marks Act, 1887, and the city analyst had given evidence that the soap, to justify its description, ought to contain at least 2 per cent. of lysol. The retailer contended that the soap was honestly compounded and did contain some, though only a minute amount of, lysol. The magistrate held that he had no power to fix a standard; if he had the power, he would have fixed 1 per cent. On appeal to the High Court the Lord Chief Justice said the magistrate was wrong in thinking that there could be no conviction so long as the soap contained any trace of lysol. The case was sent back to the magistrate with a direction to find that the offence was proved.

In Dryden *v.* Stewart and the Surrey County Council on which Mr. Justice Finlay gave judgment last week (see p. 1378) Dr. John Stewart had the assistance of the London and Counties Medical Protection Society.

LISTER INSTITUTE OF PREVENTIVE MEDICINE

UNDER the general control of Prof. J. C. G. Ledingham, F.R.S., who is also director of one of the four main departments of the Institute, some 30 workers are engaged in medical research at the Lister Institute. The department of bacteriology, serology, and experimental pathology absorbs 17, including 1 in the division of protozoology and 4 in the division of nutrition; in the department of biochemistry Prof. R. Robison, F.R.S., has 6 colleagues; Dr. G. F. Petrie, bacteriologist in charge of the department for the preparation of therapeutic sera (at Elstree), has 3; and Dr. D. McLean, also at Elstree, is solely responsible for the department for the preparation and study of vaccine lymph. Apart from these members of the staff the hospitality of the Institute is given to many holders of research scholarships and voluntary workers.

In the annual report of the governing body an account is given of the varied investigations now in progress in all these departments. A few of them are summarised below.

STUDIES ON VIRUSES

During the past five years considerable attention has been paid by workers on virus problems at this Institute to fundamental studies on the elementary bodies which are generally believed to constitute the sole effective ætiological agents in all virus diseases. The fact that these bodies can now, by various procedures, be separated from crude virus-containing material in a state of comparative purity has greatly facilitated the study of their ætiological relationships and even in those virus diseases such as chicken-pox and herpes zoster, that so far have defied attempts to secure their transmission to laboratory animals, it has been possible by serological analysis, particularly agglutination experiments with highly concentrated suspensions, to demonstrate not only an ætiological connexion between the elementary body and the virus disease but also in some cases to explore the nature of the affinities, sometimes quite unexpected, between one virus and another.

The antigenic structure of the virus of *vaccinia* has been under investigation by Dr. M. H. Salaman (Beit Memorial Research Fellow) since October, 1935. Prof. Ledingham, in collaboration with Dr. W. E. Gye, of the National Institute for Medical Research, reported in 1935 the results of experiments which indicated that the filtrable tumour-exciting agents of the Rous and Fujinami *fowl sarcomata* were probably particulate in nature. Dr. C. R. Amies has obtained further evidence that points to the same conclusion.

Microscopical examination of actively tumour-

exciting, fowl protein-free suspensions by the method of dark-ground illumination reveals the presence of numberless particles of slightly varying size. Further investigations of the properties of purified tumour-exciting suspensions are in progress.

Prof. Ledingham has for some time been engaged in a study of the relationship between the filtrable viruses of *rabbit myxomatosis* (Sanarelli, 1898) and *rabbit fibroma* (Shope, 1932), in view of Shope's observation that rabbits which had recovered from the fibroma were to a high degree protected against the fatal issue that almost invariably follows the inoculation of the virus of myxomatosis.

Studies on acute rheumatism started by Dr. Amies and his colleagues, Drs. Schlesinger and Signy, which pointed very strongly to a *virus agent in acute rheumatic fever*, are now being carried on by Dr. G. H. Eagles with the assistance of Dr. P. R. Evans and of Mr. A. G. Timbrell Fisher, whose operative procedure in the treatment of rheumatoid arthritis gives access to abnormal synovial tissue. They find that pericardial and pleural exudates and joint fluids from acute rheumatic fever, and joint fluids and synovial membrane from acute rheumatoid arthritis have yielded suspensions of bodies which are indistinguishable from elementary bodies demonstrable in similar suspensions from recognised virus diseases. Serological studies are being undertaken to support observational evidence and it is hoped thus to confirm the findings in acute rheumatic fever, to establish a possible virus ætiology in rheumatoid arthritis, and to investigate the possibility of a relationship between acute rheumatic fever and acute and subacute rheumatoid arthritis by cross-agglutination tests.

Dr. E. Weston Hurst has completed a study of the course of infection with *equine encephalomyelitis* virus. Unlike many neurotropic viruses, this virus does not reach the central nervous system by way of the peripheral nerves: during its circulation in the blood stream it may sometimes be detected on the nasal mucosa, whence, apparently, it reaches the brain by the perineural lymphatics of the olfactory nerve. Such a mode of infection of the nervous system was previously unsuspected, except, of course, when viruses are introduced directly into the nose; in nature the equine encephalomyelitis virus is one of a group transmitted by biting insects.

The investigation undertaken by Dr. Eagles in collaboration with the Danish State Serum Institute, Copenhagen, into the neutralising value of samples of serum from cases of *poliomyelitis* at different periods following recovery from the disease has been completed and the results obtained will shortly be published.

Samples of pooled serum from paralytic cases taken on an average of 29 days after recovery showed a low titre of protecting antibody. From non-paralytic cases taken about the same period a slightly higher value was obtained. In these cases sera from patients belonging to blood-group "B" were tested in one pool. This pool was shown to have a very high titre of protecting antibody. A pooled serum from abortive cases taken 13 days after recovery also showed a very high level of protective antibody. Cases tested at a later date—approximately four months after the onset of the meningitic state—showed on the whole a considerably lower titre of protective antibody. While it is impossible to generalise on a limited number of tests it would seem that considerable variation in antibody production occurs amongst individuals following recovery and that the highest titres are to be expected early in convalescence.

It would be of great value in such investigations if there were available a dried standard convalescent serum for assessing comparative value of sera tested by neutralisation experiments in monkeys.

Dr. E. Klieneberger (Jenner Memorial Research Student) has continued her work on *pleuropneumonia-like organisms* as symbionts of certain bacteria.

SEROLOGICAL STUDIES

Serological studies on the antigenic constitution, virulence, and immunising properties of bacteria are being pursued. Dr. A. Felix, with Miss R. M. Pitt and with the collaboration of Captain S. S. Bhatnagar (I.M.S.), has continued the investigation of the "Vi" antigens of *S. typhi* and of other salmonella species. The method of immunising horses for the preparation of *therapeutic antityphoid serum* has recently been simplified by the use of alcohol-treated suspensions containing both the "Vi" and the "O" antigens, since the "Vi" antibody elaborated in response to immunisation with alcohol-treated suspensions is as potent in protective action as that resulting from immunisation with the "natural" "Vi" antigen contained in the live virulent bacilli. With the recognition of the special importance of "Vi" antigen in antityphoid immunity, the study of methods of vaccine preparation which should leave this antigen intact and as effective as possible becomes desirable. Dr. H. Schütze has demonstrated by experiments with mice that for prophylactic purposes the old-established method of heat-killing and phenol-preservation is as efficient as any of the alternatives he has tested.

ENDOCRINOLOGY.—PROTOZOOLOGY

Dr. V. Korenchevsky, with the assistance of Mrs. M. H. Dennison and the voluntary coöperation of Dr. S. Levy-Simpson and Mrs. I. Brovsin, has continued to study the *effects of the sexual hormones* and of *adrenalectomy*. Joint experiments with Miss E. M. Hume on the effect of sexual hormones on vitamin-deficient rats and with Dr. J. M. Gulland on the gonadotropic hormones of the suprarenal cortex are also in progress. The coöperation with Prof. Ruzicka has been continued in the investigation of male sexual hormones.

Experiments are being made by Miss Muriel Robertson, D.Sc., with the aim of elucidating some of the principles underlying the *reactions of protozoa to various drugs* and poisonous substances. As a test object for this purpose, a ciliate (a glaucoma, probably *Glaucoma piriformis*) has been isolated in pure bacteria-free culture. This organism has been cultivated in standardised counted cultures and very regular results have been obtained. The reactions of glaucoma to inorganic arsenic (As_2O_3) have been investigated for some months with the result that acclimatisation has not been found to take place as a consequence of cultivation in sublethal concentrations of the substance. In time-exposures to lethal concentrations there is a certain advantage in survival on the part of cultures previously exposed in this same type of experiment, but not on the part of strains which had previously been cultivated in non-lethal amounts of the substance. At present it seems likely that simple selection of the more viable individuals, rather than acclimatisation is the correct interpretation of the somewhat greater viability.

NUTRITION

A collective investigation is being arranged by the *vitamin-A* subcommittee, by means of which the results of spectrophotometric examination of certain

selected materials are to be compared with those derived from biological tests carried out in several different laboratories.

The anomalous behaviour of certain forms of *vitamin D*—e.g., irradiated ergosterol and cod-liver oil—when administered as antirachitic agents to certain species (e.g., poultry) has introduced a complication into the interpretation of vitamin-D standardisation, seeing that the vitamin-D standard is irradiated ergosterol and the usual biological tests are carried out on rats. The most probable explanation lies in the discovery by Windaus and others of the existence of more than one form of vitamin D, that in cod-liver oil being different from that present in irradiated ergosterol, and birds being relatively insensitive to the second form. Miss Hume has collected the existing scattered information in the literature upon this subject with a view to its publication.

It was demonstrated last year, on a laboratory scale, that it was possible to add synthetic *ascorbic acid* to fruits and vegetables before canning without incurring great losses in the vitamin during the processing. Under conditions resembling those employed in large-scale canning equally favourable results were obtained.

WORK ON THE VITAMIN-B COMPLEX

The relation of the two constituents of *vitamin B_2* (flavin and vitamin B_6) to the skin lesions occurring in rats deprived of this vitamin has been studied by Miss A. M. Copping, who has confirmed the conclusion of György that vitamin B_6 prevents the (*a*) symmetrical florid dermatitis ("rat pellagra") and flavin the (*b*) skin affection involving loss of hair without swelling, and an exudate of serous fluid from eyes and nostrils.

The discovery of the composite nature of vitamin B_2 has led to a reinvestigation of wheat, maize, and their milling products; Miss Copping has found them good sources of vitamin B_6, but poor in flavin.

These results indicate that lack of vitamin B_6 cannot be connected with the ætiology of pellagra, since the maize diets on which populations suffering from endemic pellagra subsist are rich in this vitamin. There would seem to be a definite nutritive advantage in wheat over maize in the possession of a greater amount of flavin, seeing that the foodstuffs found by Goldberger and his colleagues to be preventive and curative of pellagra were those rich in flavin. Recent clinical trials reported from the United States have failed, however, to demonstrate any curative effect for pellagrins of administration of pure flavin.

Laboratory investigations have so far failed to explain the relative immunity from serious deficiency disease existing among populations whose staple diet is wheat and bread made from white flour, when these are compared with populations subsisting too exclusively on maize or rice, which are subject to pellagra and beri-beri respectively.

The content in these cereals of the B-vitamins has not shown differences large enough to account for the observed difference in nutritive value, although administration of these vitamins (in the form of yeast) has proved curative and preventive for both pellagra and beri-beri. It seemed possible that the use of yeast in the manufacture of bread from wheat might provide the clue. Miss M. H. Roscoe and Miss Copping, with the kind and generous coöperation of Dr. Kent-Jones, and of Messrs. Chitty, millers, of Dover, have procured special samples of wheat and white flour, and bread has been baked from these by different methods using varying amounts of a standard yeast.

The amount of the B-vitamins (B_1, flavin, and B_6) in the various ingredients and in the finished breads is now being estimated, the aim being to determine what proportion of the vitamins in the finished product is derived from the added yeast and whether any synthesis takes place during the fermentation process.

ANTI-MENINGOCOCCUS SERUM

The therapeutic action of *anti-meningococcus serum* is being studied in the department for the study and preparation of therapeutic sera. The pathogenic action of the meningococcus is apparently due to the intracellular poison which is liberated in the course of the natural disease and which can be separated from the coccal bodies under experimental conditions.

Work carried out by Dr. Petrie has led to the conclusion that this toxic substance is not antigenic and that, therefore, the therapeutic efficacy of the serum cannot be ascribed to an anti-endotoxin and is probably wholly dependent upon an antibacterial mechanism. Formerly very large intraperitoneal doses of cocci were necessary in order to produce a fatal infection in mice and it was difficult to dissociate the pathogenic effects due to the endotoxin and to the coccal invasion. It now appears that some freshly isolated strains are highly virulent and thatthe virulence of other strains is enhanced by incorporating mucin prepared from the gastric mucous membrane of the pig in the dose of the coccal suspension which is injected into the mouse; the lethal dose may contain as few as 10–20 cocci. By this means it has been found possible to arrange protective experiments which show that immune-sera from the horse can neutralise the pathogenic effect of many multiples of the lethal dose of living cocci. The mode of action of the mucin is not understood but it may be presumed to involve protection of the coccus from the phagocytic cells of the host. Dr. Petrie has begun work on the factors which influence the virulence of the meningococcus while it is living under saprophytic conditions and while it is multiplying in the tissues of the experimental animal.

Fuller knowledge of the conditions that are requisite for maintaining the virulence of this micro-organism at a high level will simplify the application of methods of assaying the potency of anti-meningococcus serum.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 6TH, 1936

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1613; diphtheria, 709; enteric fever, 30; pneumonia (primary or influenzal), 679; puerperal fever, 35; puerperal pyrexia, 115; cerebro-spinal fever, 16; acute poliomyelitis, 10; acute polio-encephalitis, 2; encephalitis lethargica, 2; continued fever, 1 (Tottenham); dysentery, 13; ophthalmia neonatorum, 76. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on June 12th was 4798, which included: Scarlet fever, 1057; diphtheria, 728; measles, 1780; whooping-cough, 533; puerperal fever, 15 mothers (plus 10 babies); encephalitis lethargica, 283; poliomyelitis, 2. At St. Margaret's Hospital there were 28 babies (plus 15 mothers) with ophthalmia neonatorum.

Deaths.—In 122 great towns, including London, there was no death from small-pox or enteric fever, 39 (11) from measles, 9 (3) from scarlet fever, 28 (7) from whooping-cough, 30 (4) from diphtheria, 36 (17) from diarrhœa and enteritis under two years, and 29 (6) from influenza. The figures in parentheses are those for London itself.

No great town reported more than 2 deaths from measles. Liverpool had 4 fatal cases of whooping-cough, Birmingham 3. Deaths from diphtheria were reported from 18 great towns: 5 from Hull, 3 from Liverpool.

The number of stillbirths notified during the week was 276 (corresponding to a rate of 45 per 1000 total births), including 53 in London.

PANEL AND CONTRACT PRACTICE

AN AMERICAN VIEW OF HEALTH INSURANCE

IT is unfortunately true that many American writings designed to impart instruction on European health insurance systems contain errors of fact, and to this must be attributed the misconceptions of health insurance that are so prevalent in America. Such, for instance, as the belief that the English system is on the verge of bankruptcy; that it is detested by the insurance doctors, who would gladly be rid of it; and some other delusions strange enough to appeal to the sense of humour which, in spite of a widespread American belief to the contrary, is an important part of the English character. Such criticisms cannot, however, be brought against the latest American book on health insurance, Dr. I. S. Falk's "Security against Sickness."[1] Dr. Falk had exceptional qualifications for his task. He was in charge of the field work carried out by the Committee on the Costs of Medical Care during their five years' study of the conditions under which medical care is given, or not given, in the United States—the most complete study of the economics of medical practice ever undertaken—and he has made a special study of European health insurance both by an intensive scrutiny of documents and by personal visits to eight European countries. The result is a valuable book: informative, eminently readable, and marked by a critical acumen that inspires confidence in the author's judgment.

Dr. Falk approaches health insurance from the point of view from which it is generally regarded by students in America and other countries where it has not yet been introduced. In Europe health insurance began as something in the nature of a savings bank. Its aim was to provide money for disabled wage-earners. Medical care came later and long held a secondary position. With the advance of medical science, which not only increases the efficiency of medical treatment but makes it more expensive, it has become of primary importance, even from an economic point of view. The inquiries of the Committee on the Costs of Medical Care show that the cost of securing adequate medical treatment by private arrangements imposes an economic burden heavier than loss of earnings due to incapacity for work. Hence in the new countries health insurance is regarded chiefly as a means of providing medical care, and the payment of cash benefits during periods of incapacity as a function to be discharged by a separate authority or by the authority administering unemployment insurance. The health insurance system adopted last March by the legislature of British Columbia, the first British dominion to introduce compulsory health insurance, gives no cash benefits but is limited to the provision of medical care.

The changes in the German health insurance system made by the National Socialist government are duly set out in this book. The insurance societies (*Krankenkassen*) have been integrated as elements of a single system, and by an equalisation fund the serious inequalities in the benefits given by the various societies have been lessened if not removed. The administration of the societies has been transferred from the old management committee to a "leader," one for each society, appointed by the government, who is assisted by an advisory board containing a doctor nominated by the local medical organisation. Thus, for the first time, the medical profession has secured representation on the bodies administering sickness insurance in Germany. The State contribution to the cost of the system has been discontinued, and the employer's contribution raised from one-third to one-half of the joint contribution of employer and employee. The sanatoria and other institutions and the preventive services of the *Krankenkassen* have been transferred to the invalidity insurance administration, and the *Hartmannbund* and other medical organisations have been dissolved and exclusive legal status has been given to a new medical body, the *Krankenkassenärztliche Vereinigung Deutschlands* (K.V.D.), which is under the supervision of the Ministry of Labour. Insurance practice can be undertaken only by members of the K.V.D., and "non-Aryans" are excluded from membership. Contracts for medical service are no longer made between the societies and individual doctors but are negotiated centrally between the insurance authorities and the K.V.D., which by its local branches distributes among the doctors of the various areas the sums available for medical remuneration.

Of special interest is the account given by Dr. Falk of the French method of medical remuneration, the *entente directe*, by which the doctor's fee for each "medical act" is paid by the patient, who is reimbursed part of the cost by his insurance society. The chief object of this method is to prevent undue calls upon the doctors' services, and it exercises an attraction on the medical profession in countries in which the adoption of compulsory health insurance seems on the way to become a matter of practical politics—in New Zealand, for instance, where the introduction of a health insurance scheme appears to be imminent. Dr. Falk's account of the method is not likely to encourage its adherents. In practice it requires a vast amount of official checks and safeguards, and it has not tended to enhance the prestige of the medical profession in the community. This is largely owing to the wide discrepancy between the fee schedule of the insurance societies and the fees charged by the doctors, which are based on the scale fixed by the local medical association. The patient is reimbursed by his society 80 per cent., not of the doctor's fee, but of the fee allowed for the service in the society's schedule, which is usually much lower. The schedule fee of the Paris societies for a day visit is 17 francs, but the minimum fee of the medical association is 30 francs, so that the patient's reimbursement (fr.13.60) forms only 45·3 per cent. of the fee actually paid. In French insurance practice there is still the barrier of a substantial fee interposed between doctor and patient. The method was adopted at the insistence of the doctors who, now that they have secured it, are not sure that it is what they really want. As Dr. Falk observes:

> "By the victory of dictating the system of remuneration and of assuring all patients completely free choice of doctor the French doctors achieved stringent limitation of fees, a complex and cumbersome fee schedule, necessity for close administrative supervision, conflicts with the insurance authorities, and a considerable loss in public esteem. The confusion which has followed upon the Pyrrhic victory seems to have exceeded what occurred in Germany with salaries, per-capita payments and fee schedules, and is vastly in excess of what has been customary in Great Britain under per-capita payments."

[1] New York: Doubleday, Doran and Co. 1936. $4.

It must be admitted that in some respects the British scheme emerges in an unfavourable light from Dr. Falk's comparative analysis. After 23 years it is still mainly concerned with the provision of cash benefits. Of the total expenditure only 38 per cent. is devoted to providing medical care, as against 60 per cent. in France, 69 per cent. in Germany, and no less than 80 per cent. in Denmark. Unlike most continental systems it provides small specialist or institutional treatment, no nursing, or laboratory aids to diagnosis; it does nothing for the dependants of the insured, and its maternity provisions are limited to a cash payment on confinement. But against these inadequacies must be set the inestimable advantage that the system has from near the beginning been worked with the cordial coöperation of the medical profession, and in this respect it stands almost alone. Moreover, though it is true that as regards the range of medical benefit the system is where it was at its inception, great advances have been made in the health work of the local authorities—e.g., in providing treatment for tuberculosis and venereal diseases, and maternity and child welfare services; and the Local Government Act, 1929, has led to further important advances. All this is recognised in Dr. Falk's book, which may be studied with profit by all who, whether as doctors or administrators, are engaged in the working of national health insurance.

PUBLIC HEALTH

ISOLATION OF SCARLET FEVER IN THE HOME

By Duncan Forbes, M.B.E., M.D., D.P.H.
MEDICAL OFFICER OF HEALTH FOR BRIGHTON

In Brighton, since October, 1931, scarlet fever patients have been isolated at home if they could be nursed in a room by themselves or in a room with their mother in a separate bed. After a period of four years I think it worth while recording the results, although even now the numbers are small.

TABLE I

A Contrast in the Numbers of Secondary and Return Cases following Home and Hospital Isolation

Intervals in days after isolation of patient	Secondary cases.								Return cases.	Total and per cent.
	6	7	8–14	15–21	22–28	29–35	36–42	42+		
Nursed at home (892 cases).	2	3	16	3	3	1	1	..	5	34 (4%)
Removed to hospital (725 cases).	..	..	3	2	1	1	..	..	34	41 (5·5%)

TABLE II

Non-immune School Contacts with Onsets 6 days or more after Notification

—	Secondary cases.	Return cases.	Total.	Percentage of contacts infected.
892 cases nursed at home in contact with 354 children of school age.	15	3	18	5·0
725 cases removed to hospital in contract with 515 children of school age.	2	25	27	5·1

As shown in Table I. the result of home isolation, particularly in the first fortnight, compares very badly with that obtained by the removal of the patient to hospital. On the other hand, under the hospital conditions stated later in the paper, it would seem that the greater infectivity of patients discharged from hospital, as shown by the number of return cases, outweighs the excess of infections from home-nursed cases during the period of isolation.

A better appreciation of the position as to infectivity is gained from Table II., which shows a greater number of school-children at risk per family in the hospital-nursed group and an equal percentage of family reinfections in each group. From this Table it appears that in the age-group 5–14 the chances of infection are about equal, whether or not the patient is removed to hospital. An analysis of Table I. shows that equal percentages of mothers are infected whether or not the child is removed to hospital, which is remarkable seeing that the mother is usually the nurse of the child isolated at home. The figures are too small, however, to justify any definite conclusion.

To make home isolation more efficient is difficult as the health officer cannot control family life; on the other hand, it is possible to avoid cross-infection in hospital by such methods as cubicle isolation, open-air nursing, and a strict isolation of the individual patient by a highly trained nursing staff. Whether or not this is worth while to save a 5 per cent. reinfection-rate in a mild disease such as scarlet fever is worthy of consideration.

Saving obtained by home nursing.—In Brighton in the years 1922–25 the removal-rate was 74 per cent., whilst in the years 1932–35 the removal-rate was 45 per cent. This meant an actual reduction of the number of patients removed to hospital in the latter period of 472. The average stay in hospital being five weeks, this meant a saving of 2360 weeks of hospital treatment. As the diminution in the number of hospital-nursed cases allowed us to nurse our tuberculous joint and other orthopædic cases in a vacated ward I estimate the saving at some £1000 a year. It may be objected that I have not taken into account the loss of school attendance by the prolonged exclusion of the contacts of home-nursed cases. In Brighton there is no such loss as the rules for exclusion of contacts is the same—namely, until the Monday week following isolation either at home or in hospital. I can trace no school or other infections from this short exclusion of contacts with home-nursed cases.

TABLE III

Intervals between the Discharge of Hospital-nursed Cases and the Onset of Return Cases

Weeks.				Months.			Total.
0–1	1–	2–	3–	1–	2–	3+	
8	7	5	2	10	2	0	34

Infectivity of the hospital-nursed cases.—The nursing of patients in Brighton is in large wards of 14 beds where uncomplicated cases after three weeks in bed mix freely with each other. The absence of cubicle nursing and the free contact of the patients who are

up and about no doubt leads to continuous cross-infection and probably accounts for the high infectivity of the patient on discharge, an infectivity which often lasts over a long period, as is shown by Table III., and by the occasional occurrence of cases at school after the return of the discharged case four clear weeks after discharge (not two weeks as is usual).

CONCLUSIONS

In cases in which the patient can have a bedroom to himself home isolation is justified: (*a*) by the non-exposure of the patient to cross-infections and his relatively low infectivity at the end of the isolation period: (*b*) by the large saving in the cost of hospital isolation of the patients and the use for other purposes of the increased hospital accommodation made available.

THE DISTRICT MEDICAL SERVICE UNDER THE POOR LAW

I

A CONTINUITY of principle may be observed in English poor-law legislation. The Poor Law Act, 1930, requires the council of every county and county borough "to set to work all such persons as have no means of maintaining themselves," but also "to provide such relief as may be necessary for the lame, impotent, old, blind and such other persons as are poor and not able to work." This differentiation between able-bodied and non-able-bodied extends as far back as an Act of 1388 under which differing treatment was laid down for "beggars impotent to serve" and "those able to serve or labour." The distinction is repeated in an Act of Henry VIII. which has reference to "every aged, poor and impotent person" and "every sturdy vagabond." The Poor Law Act of Elizabeth provided for the raising of money by the overseers, inter alia, "for relief of the lame, impotent, old, blind and such other among them being poor and unable to work" almost the wording of the Act of 1930.

Throughout this period, and until later, the relief was in respect of destitution and not sickness, and the various Acts of Parliament, including that of 1834, did not specifically provide for medical relief. The poor-law commissioners, reporting in 1840, said:—

> "Previously to the passing of the Poor Law Amendment Act there existed no statute expressly authorising the parish authorities to provide medical relief for the poor. In the statute of Elizabeth no allusion to such relief is to be found and in the subsequent Acts of Parliament relating to the poor the legislature has been entirely silent on the subject. In the absence of any positive provisions medical aid has nevertheless been supplied to the poor, and, as might have been expected from the uncontrolled discretion of the parish officers of 15,000 districts, the arrangements for the purpose have been almost infinitely various."

The commissioners who reported in 1834 on the Administration and Operation of the Laws of the Relief of the Poor made scanty reference to medical relief, remarking as regards outdoor relief: "On the whole, however, medical assistance seems in general to be adequately supplied and economically, if we consider only the price and amount of attendance." Thus, though there was an absence of direct statutory provision, medical relief had become by 1834 an established practice to a wide extent, and in certain districts medical assistance is said to have been given to practically "the whole mass of the labouring population," such assistance being given under contract of the overseers with a local surgeon. The recognition of a poor-law medical service is indicated by the terms of the letter addressed to the recently constituted boards of guardians by the commissioners on Jan. 31st, 1837, which stated: "The consideration of the Guardians, on their first day of meeting, will be bestowed on the arrangement of the districts for the administration of medical relief, and the appointments of the medical officers." The introduction of the term "district medical officer," and the first obligatory requirement to appoint fit persons to such office, appears to date from the General Order (Consolidated) 1847, while security of tenure was granted under the Medical Appointments Order, 1857.

II

The conditions prevailing in the poor-law medical service a century ago gave rise to considerable dissatisfaction. The matter is discussed in the report from the Select Committee (1838) on the Poor Law Amendment Act and in the report of the poor-law commissioners on the Continuance of the Poor Law Commission (1840). For the former evidence was taken from a number of medical witnesses, medical officers engaged in poor-law duties and others as Dr. Kay and Sir Astley Cooper, and it is of interest to recall that evidence was given on behalf of the British Medical Association, then in its infancy, by Dr. Farr who was a member of the council. For the latter report evidence was obtained from the assistant commissioners throughout the country to whom a questionnaire was submitted and a detailed memorandum was also received from the British Medical Association.

Dissatisfaction arose from various sources—undue size of districts, inadequacy of remuneration, the method of appointment, insufficient qualification. In several unions the practice prevailed of submitting the appointment, which was a yearly contract, to competitive tender, and it might go to the lowest bidder: apart from inherent objection to this system it caused grave dissatisfaction to the profession by encouraging the introduction of rivals who accepted the contract at a low figure in order to obtain a footing in the district. On this point Sir Astley Cooper said: "If a medical man comes into the district and says 'I will attend for £50 where the resident practitioner has offered to attend for £100' there can be nothing more horrible or more degrading to the profession or more injurious to the poor." On qualifications there was dissatisfaction as officers might be, and were, appointed who possessed no surgical diploma. Remuneration was evidently a thorny problem: it was provided by salary, by payment per case, or by a combination of these methods which allowed a salary for those on a permanent list and a payment per case for others: Dr. Farr estimated the average remuneration to be about 3*s*. 3½*d*. per case in the provinces and it was stated to be 1*s*. 5*d*. in the metropolis. The question of medical extras aroused comment, especially in regard to the payment per case under which system there might be motive for increasing the number of cases by encouraging applications for medical relief through "recommending extra sustenance in the form of meat, ale and wine." Passing reference is made to whole-time appointments which appear to have been first instituted in Leighton Buzzard where a salaried officer, prohibited from private practice, attended exclusively on the poor, including the workhouse appointment: this appears to have been the solitary instance but it impressed the poor-law commissioners as definitely advantageous.

Interest attaches to the memorandum submitted by the British Medical Association as a matter of history and in view of some recent developments in the district medical service. Apart from other matters the Association recommended two alternative plans for remuneration. The first was by fixed salary adjusted to the average number of cases and the average number constantly on the sick list, density of population, &c., "the average charge for one person constantly on the sick list (or for attending 365 days of illness) should be about £5 5*s*. 0*d*., or for each case of illness 7*s*. 6*d*." The second plan is of special interest as suggesting in 1839 an open choice method for the poor-law population. The memorandum reads:

1st. Let a list be formed of all legally qualified practitioners in the district or Union who have been in practice a given time (from three to five years) and who have resided in the district at least one year, who are willing to attend the paupers if called upon.

2nd. Let annual or half-yearly tickets be given to all the poor on the pauper list, or to those not on the pauper list, whom the Guardians may consider proper objects for medical relief. Let these tickets bear a certain value, according to the locality, &c.; let the poor deposit their tickets with the medical practitioner whom they shall select for their attendant. The acceptance of the ticket would guarantee his attendance for the year, or half-year, as the case might be, and he would be paid the amount of his tickets quarterly.

3rd. Or, a salary being fixed, as the amount of remuneration for any district, it might be divided according to the number of tickets each medical man might hold.

In cases where the Guardians might find it necessary to give a ticket for attendance to a person actually sick, as in the instances of those not belonging to the parish, the ticket should bear a higher value.

It is acknowledged that there are several strong objections to the above plan; it would greatly lessen the value of parochial appointments, and it is feared that, in districts where there were many medical men, the responsibility, by being so much divided, would be also lessened. Any plan of medical superintendence could not be so effectually carried out, and the registers of the cases of disease would not be so carefully attended to; still the plan is worthy of a trial.

This is an example of history repeating itself.

The Select Committee did not make very definite recommendations regarding medical service beyond the following resolution:

"That the administration of medical relief to the poor has been in many respects amended under the new law, but that there is still room for further improvement; that the medical districts, in some instances, seem to be inconveniently large; that they should be of such a size as to admit an easy access of the medical man to his patients; and that the remuneration should be such as to insure proper attention and the best medicines."

The report of the poor-law commissioners recommended a fixed remuneration such as would afford a payment per case of 6*s*. or 6*s*. 6*d*. for those on a permanent list and not exceeding 10*s*. for those not on such list, it being emphasised, however, that in the second category medical relief might be granted by way of loan which would encourage recipients to make prior arrangements by means of sick-clubs or friendly societies.

While it is of interest and advantage to recall this former history it must be remembered that there is little true analogy with present-day conditions; infectious disease was rife, but there were no isolation hospitals; tuberculosis was rife, but there were no sanatoria; the voluntary hospital system was but imperfectly developed, and treatment was almost entirely domiciliary.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt.-Comdrs. J. G. Maguire to *Adventure*, and F. W. Besley to *Victory* for R.N. Hospl., Haslar.

Surg. Lts. G. A. Lawson to *President* for three months' course, and G. S. Thomas to *Ganges* and for Shotley Sick Quarters.

Sir Gilbert Blane Gold Medals have been awarded to Surg. Capt. D. H. C. Given, R.N., retired, and Surg. Comdr. M. B. Macleod, R.N., Assistant to the Director-General in the Medical Department.

ARMY MEDICAL SERVICES

Col. J. H. Campbell, D.S.O., late R.A.M.C., having attained the age for retirement, is placed on ret. pay.

Lt.-Col. and Bt. Col. R. M. Dickson, O.B.E., from R.A.M.C., to be Col.

Col. Dickson joined the R.A.M.C. in 1908 and was an acting lieutenant-colonel in 1919. His stations have included Glasgow, Lucknow, Ferozepore, Lahore, London, and Ceylon, where he is senior medical officer. He was in France from 1914.

ROYAL ARMY MEDICAL CORPS

Lt.-Cols. A. H. Bond and S. J. A. H. Walshe, D.S.O., having attained the age for retirement, are placed on ret. pay.

Majs. to be Lt.-Cols.: J. Walker, M.C., S. Arnott, and T. L. Fraser, O.B.E.

Maj. C. P. Chambers and Capts. D. C. McC. Ettles and R. R. Leaning were successful in the examination (in written subjects) of officers with a view to promotion in the R.A.M.C.

SUPPLEMENTARY RESERVE OF OFFICERS

Lt. G. F. E. Ramsden to be Capt.

ARMY DENTAL CORPS

The War Office announces that applications are invited from dental surgeons for appointment to six commissions in the Army Dental Corps. Candidates selected will be required to present themselves in London for interview and physical examination about the middle of July next. They must be registered under the Dentists Acts or Medical Acts, and be not over the age of 28. In the first instance short-service commissions are for six years, at the end of which they may either retire with a gratuity of £1000 or apply for permanent commissions. Full particulars and form of application may be obtained from the Director, Army Dental Service, War Office, S.W.

TERRITORIAL ARMY

Capt. C. D. Bruce to be Maj.

Capt. G. Green resigns his commn.

ROYAL AIR FORCE

Wing Comdr. G. H. H. Maxwell to R.A.F. Station, Manston, for duty as medical officer.

Flight Lt. P. H. Perkins is promoted to the rank of Squadron Leader.

DEATHS IN THE SERVICES

Fleet Surgeon ROBERT FREDERICK YEO, R.N. retd., who died on June 15th at Alverstoke, Hants, qualified L.R.C.P.I. in 1875 from Trinity College, Dublin. In the following March he entered the Navy as surgeon and had risen to the rank of fleet surgeon in 1896. During operations in Egypt in 1882 he received the approbation of the Admiralty. Later he became surgeon of Malta Hospital.

Colonel JOHN POWELL, D.S.O., late R.A.M.C., who died on June 8th at Iffley, Oxford, in his 60th year, was the son of Mr. John Clarke Powell of Dublin. He was educated at Cambridge and Trinity College, Dublin, qualifying in 1899, and entering the R.A.M.C. in the following year. In September, 1909, he was attached to the Egyptian Army for seven years. From 1914–18 he served in Egypt and France, was thrice mentioned in dispatches, and awarded the D.S.O. and other distinctions. He was an all-round sportsman, proficient at tennis, swimming, and shooting.

CORRESPONDENCE

PRONTOSIL IN STREPTOCOCCAL INFECTIONS

To the Editor of THE LANCET

SIR,—In view of the promising results reported in THE LANCET of June 6th it is very desirable to complete our clinical trial of Prontosil treatment in streptococcus-infected cases as quickly as possible; and subsequently—if laboratory tests seem to warrant it—to undertake a similar thorough trial with the related substance *p*-aminobenzenesulphonamide in a similar large group of puerperal fever cases, in order that the experience gained with both agents may become generally available without delay.

To this end we would ask for the coöperation of private doctors, hospitals, and public health authorities in sending to us puerperal fever cases which are known to be, or likely to be, infected by hæmolytic streptococci. Needless to say we do not want old-standing cases of parametritis, white leg, &c., nor do we suggest the removal of moribund cases to hospital. Acute early cases seem likely to benefit most by the treatment. To secure admission it is only necessary to communicate with the resident medical officer by telephone (Riverside 6081/2), giving a few particulars of the case.

I am, Sir, yours faithfully,

LEONARD COLEBROOK.

Bernhard Baron Memorial Research Laboratories, Queen Charlotte's Hospital, W., June 12th.

EARLY AMPUTATION FOR SEVERE INJURY

To the Editor of THE LANCET

SIR,—With reference to an annotation under this heading in your issue of May 30th (p. 1249), it was at a meeting attended by many members of the R.A.M.C. that Prof. A. K. Henry, head of the surgical unit at the Egyptian Faculty of Medicine, Cairo (Kasr-el-Ainy Hospital), formulated his preliminary ideas and results. Unfortunately, owing to a crowded programme, there was no time to prolong the discussion or emphasise the revolution these ideas should cause in the practice of advanced dressing stations, field ambulances, and first-line casualty clearing stations. Abdulsamie's paper gives a very clear description of the ideal treatment and I maintain that the case for "immediate" amputation is proved.

Your call for further observations is certainly well timed, and I hope that officers of the fighting services will be able to give their views and opinions. At the commencement of the last war I was with the French VIIIth Army and I was greatly hampered by the official attitude that an amputated patient was an expense to the State. I am happy to remember that with the British forces no consideration of future pensions was allowed to interfere with our practice; but with the vastly accelerated means of transport in late years I am afraid there may be a danger of trusting to rapid evacuation of severely wounded instead of immediate attention, that is "amputation," to the severe crushes in the first-line units.

I am, Sir, yours faithfully,

H. STIVEN,
Retd. Lieut.-Col., R.A.M.C.

Demerdache Hospital, Cairo, June 9th.

THE PHANTASY OF MURDER

To the Editor of THE LANCET

SIR,—I understand that the murderer of a woman in a Clapham flat has had his appeal dismissed and as this matter is no longer sub judice it is permissible to draw attention to a fact that has long been neglected. This man made a confession of having committed another murder three years ago, but was acquitted. This acting a phantasy of murder indicates the future murderer but it is treated by the judicial authorities with off-handedness.

This is by no means the first case in which a murderer has made a false confession and has had it disregarded by the police but has proceeded to commit a real murder. Some years ago a young man confessed to the police in Dartford that he had killed a boy. His confession was found to be false and he was discharged and told not to be so foolish. A few days later he took a knife and with it killed a girl on Dartford Heath. I have recently pointed out that this false confession of murder is an early symptom of schizophrenia (Clin. Jour., May, 1936), but there is little opportunity to confirm this belief. I would suggest, however, that the matter is proved sufficiently for all persons making false confessions of murder to be recommended by the judicial authorities for medical examination by a trained psychiatrist. If this is done some unfortunates may avoid being murdered and some schizophrenics avoid hanging.

I am, Sir, yours faithfully,

Harley-street, W., June 16th. CLIFFORD ALLEN.

AVITAMINOSES

To the Editor of THE LANCET

SIR,—In a recent paper [1] Loewenthal, working in Uganda on cases o. vitamin-A deficiency, summarises the signs and symptoms which have so far been ascribed to this deficiency, and divides them into those which he accepts and those of which he is doubtful, as follows:—

ACCEPTED

Eye manifestations.—Xerophthalmia; keratomalacia; night-blindness.

Skin manifestations.—Harsh dryness of the skin, with tendency to papular eruption. Nails lose lustre and become striated and brittle.

DOUBTFUL

1. "Neuritis."
2. "Sore mouth"; perlèche.
3. "Itchy" scrotum.
4. Diarrhœa and dysentery.
5. General infections.
6. Cutaneous sepsis.
7. Changes in the hair.

With regard to the first three of the "doubtful" group, a paper by Pallister and myself [2] proves fairly conclusively, if not absolutely, that they are due to a deficiency of the P-P (pellagra-preventive) factor; it is significant that Loewenthal states that it is now generally believed that perlèche is due partially to an attack by fungus on the mouth, while Pallister and I found similar evidence of fungus attacking the scrotal skin in some of our cases and that a fungicide such as Whitfield's ointment was of value in treatment. Fungus in these cases seems to me to play a similar part to that of sun exposure in pellagra, having an excessive effect on the skin of those people who have deficiency of the P-P factor in their food. The diarrhœa and dysentery so long associated with pellagra may well be, as far as my experience of a few cases of characteristic pellagra in Malaya goes, causative factors in producing pellagra rather than effects of pellagra. If these arguments can be confirmed, then pellagra throughout the world may be finally accepted as due to deficiency

[1] Loewenthal, L. J. A.: Ann. Trop. Med., 1935, xxix., 467.
[2] Landor, J. V., and Pallister, R. A.: Trans. Roy. Soc. Trop. Med. and Hyg., 1935, xxix., 121.

of the P-P factor, and the disease we have described in Malaya may be accepted in turn as pellagra. I have not in Malaya seen any evidence that Loewenthal's "doubtful signs," Nos. 5, 6, and 7, are due to deficiency either of vitamin A or the P-P factors specifically.

Whether the name vitamin B_2, vitamin G, or P-P factor is used seems not to matter at present if one recognises that a chemical substance present in yeast, and present in many protein foods, which survives autoclaving, will cure these pellagrous conditions in their early stages, and that in all communities that subsist chiefly on carbohydrate food a reasonable amount of protein food containing the P-P factor is required to balance, possibly to detoxicate, the carbohydrate. The biochemists may wish to confine the term vitamin B_2 to a particular chemical in food necessary for the growth of rats, or to subdivide it, or may even wish to discard it altogether; it is for that reason that I have used the name P-P factor in this letter.

I may mention here the other chemical substance, stated to be present in autoclaved yeast, which was found somewhat successful by Lucy Wills [3] in treating tropical macrocytic anæmia; personally, I have not found yeast or Marmite alone very beneficial in tropical macrocytic anæmia in Malaya. I believe that the treatment of the many factors concerned in the causation of such anæmia, certainly including malnutrition, is essential. It is of significance that the involvement of the central nervous system which may occur in macrocytic anæmias closely resembles that seen in cases of deficiency of the P-P factor; and nutritional peripheral neuritis, or beri-beri, may prove to be a closely related nervous disease so that the vitamin-B complex may ultimately be united in a whole once more.

I am, Sir, yours faithfully,

J. V. LANDOR.

General Hospital, Singapore, May 21st.

COMPLETE TRANSPOSITION OF THE VISCERA

To the Editor of THE LANCET

SIR,—I am anxious to obtain information about this condition, which I believe to be inherited as a Mendelian recessive, and shall be much obliged if anyone who sees a case will send me the following data. Are the parents blood relations or not? If they are blood relations, are they first cousins, and, if not first cousins, what is their exact relationship? I should also like to know the number and sex of the normal brothers and sisters, the sex of the patient, whether the parents are normal, and whether there is a history of a previous case in the family.

I am, Sir, yours faithfully,

E. A. COCKAYNE.

91A, Harley-street, London, W., June 11th.

AN OLD MEDICAL BENEVOLENT SOCIETY

To the Editor of THE LANCET

SIR,—Every medical man and woman is in sympathy with the work of the Royal Medical Benevolent Fund which completes its centenary this year and is the senior medical charity in this country. I should like, if I may, to bring to the notice of your readers an even older benevolent medical society which is not a charity but a provident association, the members of which insure themselves against ever needing the help of the Royal Fund. The Essex and Herts Benevolent Medical Society was instituted in 1786 and has the Marquess of Salisbury as president. It is available for medical men residing in the two contiguous counties and is intended primarily for the assistance of widows and orphans; if from sickness, infirmity, or other unavoidable misfortune a member becomes totally incapacitated he can petition the court of the district in which he resides, and such cases have been generously helped. It astonishes me how few medical residents in Essex and Hertfordshire have taken advantage of the comfort it must be to many of them to feel that if they are taken their widows and children will have such consideration—and for the trifling subscription of one guinea a year.

I am, Sir, yours faithfully,

F. L. NICHOLLS.

Fulbourn, near Cambridge, June 11th.

GASTRO-ENTEROSTOMY IN INFANCY: TWENTY YEARS AFTER

To the Editor of THE LANCET

SIR,—In 1918 notes were published [1] of a case of Gastro-enterostomy at six weeks for Pyloric Stenosis; the patient recovered, and a few days ago he called to see me, now a man in his twentieth year. I did not make any clinical examination, but he stated that he was in perfect health, and to all appearances this is true. He is 6 feet in height and weighs 13 stone. I suggested to him that he should have an X ray examination of the stomach, as I wondered whether the pylorus had resumed its function, or whether the stomach still emptied through the stoma made at operation. From the report of the radiologist, Dr. H. Franklyn, it seems that stomach contents still pass entirely through the stoma. Gastro-enterostomy, for congenital pyloric obstruction, has now been superseded by a simpler operation. It is probable that not many persons are alive who have grown up from infancy with this condition, and I thought it would be of interest to report the progress of this case after so many years.

I am, Sir, yours faithfully,

Bradford, June 15th. T. JASON WOOD.

ZINC IONISATION FOR HAY-FEVER

To the Editor of THE LANCET

SIR,—I read with some surprise the report in the lay press of a new 99 per cent. cure for hay-fever by intranasal ionisation, emanating from one of the London centres of medical education. I have been using the treatment there referred to since 1925, described my method first in the *British Medical Journal* in June, 1931, and reported a further series of results in 91 cases in April, 1932, in the same place, bearing out my original hopeful prognosis. In March, 1935, in an article in the *Medical Press and Circular*, I pointed out that in 5 per cent. of cases successfully treated in one year, there was failure in the succeeding year. Much depended on the selection of cases and the varying intensity of the symptoms from year to year. In my own experience of 600 cases personally treated I can claim but 60 per cent. "relief"; and though this is of considerable value to the patient, it is only relief, not, except on the rarest occasion, a permanent cure.

I am, Sir, yours faithfully,

PHILIP FRANKLIN.

Weymouth-street, W., June 16th.

[3] Brit. Med. Jour., 1931, i., 1059.

[1] THE LANCET, 1918, i., 804.

PARLIAMENTARY INTELLIGENCE

THE MIDWIVES BILL IN COMMITTEE

ON June 11th the Midwives Bill was further considered by Standing Committee C. of the House of Commons.

Compensation

On Clause 5 (Compensation to midwives ceasing or required to cease practice) an amendment by Sir KINGSLEY WOOD extending the provision of the clause to midwives who during 1935 gave notice of intention to practise was agreed to.—The MINISTER further moved a series of amendments designed to deal with the question of compensation paid to a midwife by a local authority. As drafted, he said that the clause provided that compensation payable to a midwife should be calculated with reference to her net emoluments during her period of work in the area of the authority up to a maximum of three years. The amendments were designed to secure that the calculation should be on the basis of the midwife's average net emoluments during a period up to three years in whatever area she might have worked. In as much as the local authority to whom the midwife surrendered her certificate would pay her the whole of her compensation, arrangements would be made by which such local authority could recover the appropriate proportion of such compensation due from other local authorities in whose areas the midwife might be working at the time her certificate was surrendered.—The amendments were agreed to.

Captain ELLISTON moved an amendment, the object of which was to allow a midwife to select either a three-year or a five-year period as the basis for the payment of her compensation.—Mr. SHAKESPEARE thought they ought to trust local authorities to act in a reasonable spirit.—Sir F. FREMANTLE urged the Minister to approach this question sympathetically. There was a danger, he said, that if the elderly midwives could not be assured of adequate compensation they would be compelled to carry on their work.—Sir KINGSLEY WOOD promised to look into the matter before the report stage.

Mr. PETHERICK moved an amendment providing that if any midwife was aggrieved by the refusal of an authority to pay her compensation under the clause, or by the amount of the compensation paid, she might appeal to the Minister whose decision should be final, or alternatively to a county court in accordance with the rules of court.—Sir KINGSLEY WOOD said he hoped the committee would not allow an alternative appeal but would decide in favour either of the Minister or the county court.—This amendment was withdrawn.—Mr. LUNN then moved an amendment providing that the appeal should be to the Minister whose decision should be final, which was agreed to.

Mr. KEELING said in the Bill as drafted midwives who retired voluntarily, or were required to retire from practice, were referred to as having been "removed from the roll." He did not think that such a phrase, which was ordinarily used in connexion with punishment for misconduct, should be employed in this connexion. Secondly, he thought it was desirable that there should be a potential reserve of trained midwives which could be drawn on in case of emergency, and such a reserve might be found among the retired midwives.—Mr. SHAKESPEARE said the Government did not anticipate any danger of a shortage of midwives.—Sir F. FREMANTLE thought it was a pity during the experimental stage of the Act to make a final decision and remove all these women from the roll.—Sir KINGSLEY WOOD said that where compensation had been paid for loss of office, if the person compensated returned to work the compensation paid would have to be returned. He did not anticipate that in any large number of cases under this Bill compensation would be paid back.—Captain ELLISTON said that it was unfair that these retired midwives should be shut out permanently from working in their profession. The midwives felt strongly on the subject.—The amendment was withdrawn.

On the question that Clause 5 stand part of the Bill,

Mr. BATEY urged the Minister to reconsider the question of the word "net" in the case of midwives' annual emoluments. He thought they should simply take a three years' average.—Mr. M. BEAUMONT said that the Minister could not drop the word "net" because it was in the financial resolution. If the word "net" were taken out it would impose a charge. The term "net" meant the takings with all possible outgoings removed.—Sir KINGSLEY WOOD said in putting the word "net" in the Bill he was carrying out the suggestion of the Joint Midwifery Council. He did not think any serious difficulty would arise. When the Bill had passed he would lay down the general lines on which the authorities should work under this clause.

Prohibition of Unqualified Persons

On Clause 6 Mr. BATEY moved an amendment to exclude from the clause the exemption given to nurses registered under the Nurses Registration Act, 1919. He knew women, he said, who had been acting most successfully as maternity nurses for the past 20 years, but they had not bothered to register under the 1919 Act. This clause would take away their living.—Mr. SHAKESPEARE said the suggestion went contrary to the opinion expressed both by the Departmental Committee and by the Joint Midwifery Council. Those bodies were unanimous in stating that one of the great causes of mischief in the nursing of women in childbirth was the practice which had grown up in certain parts of the country of employing absolutely unqualified women in attendance during the ten days of the confinement. Doctors did not like the system, but it had never been found possible to abolish it. This clause was vital to the Bill. What it said was that no unqualified woman should attend a woman as a maternity nurse. As to exemption under the Nurses Registration Act he thought sufficient time had elapsed for the list to be fairly comprehensive.—Sir F. FREMANTLE said they had to recognise that there were not enough trained midwives to go round, especially in the more scattered areas of the country. It was therefore essential to allow the latitude given under this clause to registered nurses.—The amendment was rejected.

Mr. SHAKESPEARE said the intention of the clause was that a doctor should be able to employ nurses with general qualifications, and therefore he moved an amendment to limit the exemption under the clause to those nurses appearing on the general part of the Nursing Register. He also moved a consequential amendment dealing with the special case of institutions run by local authorities or others, and under this amendment discretion would be left to the medical officers in charge of the particular institution. The institutions affected by the amendment comprised any nursing home registered under the Nursing Homes Registration Act, 1927, or exempt from the operation of that Act under Section 6 thereof.—The amendments were agreed to and Clause 6 as amended was ordered to stand part of the Bill.

On the Second Schedule, Mr. SHAKESPEARE moved an amendment to enable a midwife who was practising in two or three areas to surrender her certificate to one local authority who would pay her compensation, and then the other authorities would make proportionate contributions according to the amount of work which the midwife had done in their respective areas.—The amendment was agreed to.

The committee stage being concluded the Bill as amended was ordered to be reported to the House.

NOTES ON CURRENT TOPICS

Importation of Scientific Apparatus

In the House of Commons on June 10th on Clause 8 of the Finance Bill Mr. MACLAREN moved an amendment to take away from the Import Duties Advisory Committee the discretionary powers as to the admission into this country of goods intended to be used in scientific research or for the purpose of advancing any branch of learning or art. The amendment, he said, was consistent with the idea of the clause which laid down that the exempted goods were not intended to be sold. These articles were not imported to compete against the production of anybody else. They were for the advancement of the intelligence of the community and therefore there should be no discretionary power left to any advisory committee.—Mr. SILVERMAN in supporting the amendment cited the case of a refugee with a German medical qualification, who was prevented under the existing régime in his own country from pursuing his professional activities there. He was allowed to come here with a temporary visa which, unless it was extended, would expire next week. When he entered this country six months ago he brought with him certain instruments about which he was quite properly challenged by the Customs authorities. He asked if he had to pay duty on them, and was told that he could bring them in provided he deposited a sufficient amount to cover the eventual duty if it was to be levied. He agreed to do so and deposited £150. That was six months ago, but the authorities had not yet made up their minds whether duty was leviable or not.—Mr. CHAMBERLAIN, Chancellor of the Exchequer, said that the effect of the amendment would be that an importer having established to the satisfaction of the Advisory Committee that he had fulfilled the two conditions under the clause would at once be able to demand the right of importation of these articles free of duty. That would be inconsistent with the provisions of the Import Duties Act and the duties which were laid upon the Advisory Committee in considering any application made to them. If the amendment were carried many articles which would fulfil the two conditions could be imported free of duty, although they could equally well be made at home. That would be contrary to the spirit of the Act.—Mr. A. BEVAN said that in this very special market it surely should be possible for people to buy scientific instruments where they wished. It was not desirable that they should hand over a monopoly for the making of scientific instruments to anyone in this country. It was a good thing that the makers of instruments here should have to compete with manufacturers in other parts of the world in order that our own scientific progress might be kept abreast of the rest of the world.—Mr. BENSON said that in the case of certain drugs, particularly organic drugs, the products of two firms might so far as could be ascertained be identical in quality, yet it might be known that they had quite different physical and theoretical effects. If an experimenter in this country decided that he wanted to experiment with a German drug, or if he felt that the German drug gave a better result, he would go to the Advisory Committee and ask for permission to import, explaining that the drug was for purely scientific investigation, and then under the second part of their instructions they would have to decide whether the importation was expedient. It was ridiculous to suggest that the Advisory Committee were capable of coming to a decision on matters of scientific experiment with the accuracy and precision that an experimenter could exercise.—After further debate the amendment was negatived by 217 votes to 135.

River Pollution and Public Health

In the House of Lords on June 11th Lord GAINFORD moved the second reading of the Public Health (Drainage of Trade Premises) Bill. He said that the principle of the Bill was to improve the purity of the streams and rivers of this country. It was based on the recommendations of a Joint Advisory Committee appointed in 1930 by the Ministry of Health. That committee recommended, first of all, that the local sanitary authorities in the country should take and dispose of trade effluents. They also recommended that traders should have a right to discharge their effluents into the sewers of the local sanitary authorities; that there should be regulations for the preliminary treatment of these effluents where necessary; that they should provide separate sewers, if necessary; and that the local sanitary authorities should have the right of access to traders' premises in order to inspect the effluents in regard to the poisonous matters which might have to be taken into their sewers. Further, they recommended that certain poisonous effluents should be excluded; that riparian interests should be protected, and that the Ministry of Health should have power to interfere where it was thought necessary in the interests of various authorities. Those recommendations had practically all been accepted in the provisions of this Bill. Examination of the recommendations had been made by a great number of parties interested in the purity of our rivers, including the Society of Medical Officers of Health, and all of the bodies consulted had agreed to them. The Ministry of Health had been consulted also as well as the Ministry of Agriculture and Fisheries, the Federation of British Industries, the County Councils Association, the Urban and Rural District Councils Association, and the Association of Municipal Corporations. He hoped that before the committee stage there might also be consultations with the London County Council and the Standing Joint Committee of the Metropolitan Borough Councils so that they might have their support in addition to that of the other bodies he had mentioned. By the passage into law of this Bill they would do something to improve the condition of the water-supply as well as to improve amenities.

Lord RITCHIE OF DUNDEE said he was afraid if this Bill passed unamended it would not have the effect desired. He was speaking on behalf of the dock and harbour authorities, many of whom were vitally concerned with questions relating to the purification of their waters and with obstructions caused to navigation through sewage effluents falling into those waters. The Port of London Authority had been gravely concerned for years at the condition of the water in the Thames. The difficulties which were very great would be increased under this Bill.—Lord MELCHETT said he thought that the measure was designed to improve existing conditions, and he hoped that it would receive a second reading.—The Earl of LISTOWEL said the London County Council was as anxious as anyone else to preserve the purity of streams and tidal waters, and welcomed the principle embodied in the Bill.—Viscount GAGE said the Government's attitude towards the Bill was one of sympathy, and they were glad to see the degree of unanimity which had been reached. Some further safeguards might be necessary on the committee stage.

The Bill was read a second time.

QUESTION TIME

WEDNESDAY, JUNE 10TH

Fire Prevention in Hospitals and Institutions

Mr. KELLY asked the Minister of Health whether recommendations had been made to hospitals and other institutions as to the prevention of and protection from fire; and whether any committee of experts had been appointed to deal with these dangers.—Mr. SHAKESPEARE, Parliamentary Secretary to the Ministry of Health, replied: No general recommendations have been issued by my Department, but attention is drawn to the importance of this matter when plans of buildings are being considered, or otherwise as occasion arises. My right hon. friend is not aware that any committee of

experts has been appointed to deal with safeguards against fires at institutions.

Mr. KELLY asked the President of the Board of Education whether he had received reports as to school buildings and their protection from fire; and what steps had been taken to issue recommendations on fire prevention to all schools, public and private.—Mr. OLIVER STANLEY replied: If in the course of inspection H.M. inspectors find that the safeguards against fire are inadequate the attention of the school authorities is called to the matter. The Home Office handbook, "Fire Precautions in Schools," has been brought to the notice of local education authorities and the governors and managers of schools recognised by the Board in the Board's Circular 1446, dated Jan. 20th, 1936.

Motor Driving Tests

Mr. MCENTEE asked the Minister of Transport the number of men and women examined for the driving test up to the last available date; and the number that had failed.—Mr. HORE-BELISHA replied: Up to and including May 30th, 316,886 persons have been examined, of whom 57,594 failed to satisfy the examiners. From May 6th, 1935, since when separate records for men and women have been kept, to May 30th, 1936, the figures are:

Men examined	.. 234,827	Failed	.. 41,083 (17·4%)
Women ,,	.. 55,248	,,	.. 14,094 (25·5%)

Wheat Reserve for War Emergency

Mr. LIDDALL asked the Minister for the Coördination of Defence what steps had been taken to build up in this country a reserve of wheat sufficiently large to meet any contingencies likely to arise in the event of war.—Sir T. INSKIP replied: The question of a sufficient wheat reserve will be considered by the committee which is now engaged in examining the whole subject of food supplies in time of war. At the present time, including the balance of the home crop, the wheat in public granaries and millers' stores, and flour in the hands of millers, bakers, and retailers, the effective stock of wheat and flour in this country is understood to be about equal to three months' consumption. This figure does not include wheat normally on passage, which might amount to a further month's consumption.

THURSDAY, JUNE 11TH

Surveys of Overcrowded Housing Conditions

Mr. GRAHAM WHITE asked the Minister of Health if the survey of overcrowded conditions, as defined by the Housing Act, 1935, had been completed; and if he could give some indication of the number of houses overcrowded and the number of persons concerned.—Sir KINGSLEY WOOD replied: Up to June 1st 1024 local authorities had submitted reports. The reports show that 6,431,464 houses were inspected, of which 247,884 were found to be overcrowded. These reports include 55 county boroughs, in which 1,902,149 houses were inspected and 71,600 were found to be overcrowded. Up to June 10th reports have been received from 1272 local authorities out of a total of 1536. These reports show that 7,893,399 houses were inspected, and 296,738 were found to be overcrowded, an average of 3·8 per cent. The reports received include most of the large centres of population and I do not think that the results are likely to be substantially affected when the outstanding reports which I have urged local authorities to submit forthwith are received.

Health Visitors and the Pre-School Child

Mr. JOEL asked the Minister of Health whether it was his intention that, in connexion with the visiting by health visitors of all children under the age of five who did not attend school, such visitation would affect all classes of the community; and, if not, how the scope of such visits would be limited.—Sir KINGSLEY WOOD replied: I have recently issued a circular on this subject. The question of visiting in any particular case is one within the discretion of the local authority, who will naturally take account of the extent to which to their knowledge the health of the child is already supervised.

Destruction of Human Food

Mr. WILSON asked the Minister of Health the cases brought to his notice in which, during the last 12 months, food of any description fit for human consumption had been destroyed and, in each case, the reason for the destruction and the action taken by the department, either before the destruction or since; and whether it was intended to take further powers to prevent such destruction.—Sir KINGSLEY WOOD replied: No such cases have been brought to my notice as having occurred in England or Wales, and I do not consider that it is necessary to take steps to obtain further powers in the matter.

Midwifery Bill for Scotland

Mr. LEONARD asked the Secretary of State for Scotland if he proposed to present to Parliament a Midwifery Bill for Scotland; and, if so, when he would introduce it.—Lieut.-Colonel COLVILLE, Under-Secretary of State for Scotland, replied: Yes, Sir. It is the intention of my right hon. friend to introduce a Bill this session, but he is not yet able to announce a definite date. As the hon. Member is aware, the Scottish problem differs both in nature and extent from that in England, and in framing proposals my right hon. friend has thought it expedient to secure the fullest measure of agreement with local authorities and other interests concerned. Consultations to that end are actively proceeding.

Committee on Scottish Health Services

Mr. LEONARD asked the Secretary of State for Scotland when the report of the Committee on Scottish Health Services would be available.—Lieut.-Colonel COLVILLE replied: I understand that the report of the Committee on Scottish Health Services will probably be submitted to my right hon. friend by the end of this month. Publication will follow immediately the report is received.

MONDAY, JUNE 15TH

Destruction of Human Food

Mr. WILSON asked the Minister of Agriculture if he would state the cases brought to his notice in which, during the last 12 months, food of any description fit for human consumption had been destroyed, and in each case the reason for the destruction and the action taken by the department either before the destruction or since; and whether it was intended to take further powers to prevent such destruction.—Mr. ELLIOT replied: The only such cases that have been brought to my notice relate to certain heavy landings of highly perishable fish which the port markets were unable to absorb. The quantities of fish thrown back into the sea were about 4 or 5 tons of pilchards in November of last year, and about 60 tons of herrings in August and September of last year and in May of this year. The absence of the Italian market was mainly responsible for the destruction of the pilchards. As regards the steps which might be taken to deal with occasional landings of herrings surplus to the capacity of the markets, I would refer the hon. Member to the answer I gave on June 11th. As these cases occur only very exceptionally, the quantities involved in those I have mentioned amounting to not more than 0·01 per cent. of the landings of wet fish by British fishing vessels in England and Wales for the last 12 months, I do not think it would be possible to provide against them by legislation.

Physique of Recruits for Defence Services

Mr. EMMOTT asked the Prime Minister what percentage of the applicants to the recruiting offices last year were refused on the grounds that they were not physically fit; and what steps the Government proposed to take to raise the present level of the physique of the nation.—Mr. BALDWIN replied: The percentage for England, Scotland, and Wales is approximately 35. As regards the last part of the question, I would refer my hon. friend to Circular 1445 issued by the Board of Education in January last, from which he will see that in addition to giving close attention to the various health services, such as the School Medical Service and the Maternal and Child Welfare Service, it is the Government's policy to promote the development of physical education for children of school age and for persons no longer attending school.

Viscountess ASTOR asked the Prime Minister to bear in mind that children who attended nursery schools were

5 lb. heavier and were taller than other pupils entering the elementary schools, and that the latter were physically defective; and that the only way to put this right was through a proper system of open-air nursery schools.

Mr. JOHNSTON asked if the right hon. gentleman was aware that in addition to the 35 per cent. of recruits rejected as physically unfit, another 30 per cent. were rejected later as medically unfit. As there was genuine agreement on all sides of the House that something ought to be done to improve the nutrition of the people, would the Prime Minister provide an opportunity for discussing the matter?

Mr. BALDWIN said that if the question was raised it would be discussed. This was a matter which the Government now had in hand.

Nutritive Values of Foods

Mr. LENNOX-BOYD asked the Minister of Health whether he had any statement to make on the fact, quantitative and qualitative, in relation to the diet of the people, or any proposals to effect changes therein which might appear desirable in the light of modern advances in the knowledge of nutrition.—Mr. SHAKESPEARE, Parliamentary Secretary to the Ministry of Health, replied: These questions have been referred to the Advisory Committee on Nutrition. As regards the facts the committee have reported that the available data are insufficient and have recommended the collection of further particulars. The committee have, however, recently stressed the importance of milk as a food.

Mr. SANDYS asked the Minister of Health the present average daily consumption per head of milk; and, in view of the conclusions of the recent report of the Advisory Committee on Nutrition, what steps he proposed to take further to increase it.—Mr. SHAKESPEARE replied: The present daily consumption of liquid milk in this country is estimated at slightly less than half a pint per head. The Government accept the views expressed by the advisory committee as to the high value of milk as a food, and schemes for the provision of milk, either free or at cheap rates, to mothers and children are now in operation. The Government will give consideration to the further development of these schemes, but this must await the general review of milk policy which will take place when the report of the Milk Reorganisation Commission is available.

Replying to Miss Horsbrugh, Mr. Shakespeare said that he fancied it was the case that the half-pint per head included the milk supplied in schools.

TUESDAY, JUNE 16TH

Dietaries in Scottish Prisons

Mr. JOHNSTON asked the Secretary of State for Scotland whether he would give for each of the five rates of dietaries in use in Scottish prisons the approximate cost of the food supplied to the prisoners per day; and what steps, if any, he proposed to take to ensure that the law-abiding working classes should be at least as well fed as the inmates of prisons, whose diet was prescribed by the regulations approved in June, 1931, and amended in August, 1932, and March, 1933.—Sir GODFREY COLLINS replied: The approximate wholesale cost of the ingredients of the items in the Dietary Rates per person per day in 1935 is as follows:—

Rate I.	4¾d.	Rate IV.	6¾d.
,, II.	5d.	,, V.	
,, III.	5¼d.		

The costs would, of course, be higher if the [redacted] had to be purchased at retail prices. In [redacted] figures I am unable to accept the suggestio[n] last part of the question.

Mr. JOHNSTON asked if the right hon. [redacted] not been assured by his medical adviser[s] these prisons that the prison population [is] after a period in prison than they were whe[n]

Sir G. COLLINS said that not only wa[s] better, but the regular life they led and t[he] did had some bearing on this point.

MEDICAL NEWS

University of Cambridge

The general board propose to establish a post of assistant director of research in medicine. The holder will work at Addenbrooke's Hospital and the laboratories of the university under the direction of the regius professor of physic. If the appointment is made it will be for an initial period of three years at £700 a year.

On June 12th the following degrees were conferred:—

M.D.—Charles Hill.
M.B., B.Chir.—H. F. Anderson, D. N. Matthews, and J. D. M. Jones.
M.B.—C. A. Dowding.
B.Chir.—E. M. Darmady.

Royal College of Surgeons of England

A meeting of the council was held on June 11th, with Sir Cuthbert Wallace, the president, in the chair. Prof. Einar Key, of Stockholm, was admitted an hon. fellow of the College, and the honorary college medal was presented to Dr. J. A. Murray, F.R.S. Mr. R. M. Vick was re-elected to the court of examiners, Mr. W. Sampson Handley was reappointed as representative of the College on the court of governors of the University of Sheffield, and Dr. John Beattie was appointed as representative on the British National Human Heredity Committee. The Hallett prize was awarded to Kenneth William Starr of the University of Sydney, and the Sir Gilbert Blane medals to Surgeon Captain D. H. C. Given and to Surgeon Commander M. B. Macleod.

Diplomas of fellowship were granted to the following:—

A. S. Wesson, M.R.C.P. Lond., Univ. Coll.; D. C. Price, M.B. Lond., St. Bart.'s; Jean M. Dollar, M.B. Lond., Royal Free; G. S. Seed, M.B. Leeds, St. Bart.'s and Guy's; N. S. I. Narasimhan, L.R.C.P. Lond., Madras and Guy's; A. G. Williams, M.B. Wales, St. Bart.'s; E. R. G. Passe, L.R.C.P. Lond., St. Thomas's; R. H. Young, M.B. Camb., St. Thomas's; C. F. Evans, L.R.C.P. Lond., Melb. and Edin.; K. H. C. Hester, M.B. Lond., Guy's; L. W. Lauste, M.B. Lond., St. Thomas's; A. L. Kenyon, M.B. Manch.; O. J. Vaughan-Jackson, B.M. Oxon., London; J. R. Blackburne, M.B. Lond., St. Bart.'s; G. H. C. Ovens, M.B. Lond., St. Mary's; W. M. Capper, M.B. Lond., St. Bart.'s; Alan Bowen-Davies, M.B. Camb., Guy's; A. G. Cross, M.B. Camb., St. Mary's and London; Bodo Schulenburg, M.B. Cape Town, St. Thomas's and St. Bart.'s; Ralph Shackman, M.B. Lond., St. Bart.'s and Sheffield; S. A. Mian, M.B. Punjab, London; R. L. Benison, M.B. Camb., St. Bart.'s; A. E. De Sa, M.B. Bombay, Univ. Coll.; J. D. Fergusson, M.B. Camb., St. Thomas's; F. I. Evans, L.R.C.P. Lond., Camb. and Guy's; S. Y. Feggetter, M.B. Durh.; G. N. Sen, M.B. Calcutta, St. Bart.'s; S. M. Thompson, L.R.C.P. Lond., Leeds; J. G. Bonnin, M.B. Melb.; T. M. d'Offay, M.B. Edin., Sheffield; F. G. Fenton, M.B. Melb., Guy's; R. W. S. Fox, M.B. Melb., Guy's; C. H. W. Lawes, M.B. Sydney, St. Bart.'s; Ruby G. Sharp, M.B. Cape Town, Guy's; Jacob Sherne, M.B. Leeds, Guy's; W. H. M. Smith, M.B. Edin., Liverp.; K. W. Starr, M.B. Sydney; J. C. Stewart, M.B. Melb., London; R. R. S. Strang, M.B. Glasg., Univ. Coll.; and Gerald Townsley, M.D. Belf., Univ. Coll.

Diplomas of membership were granted to Gordon Williams and Walter L. Isaac, of St. Mary's Hospital, and diplomas in anæsthetics were granted jointly with the Royal College of Physicians to the following:—

R. A. Beaver, Donald Blatchley, Henry Canwarden, J. A. Carman, Bernard Coden, Phyllis F. L. Daplyn, C. J. M. Dawkins, M. M. Deane, Margaret L. A. Galbraith, Harry Grant-Whyte, V. A. Goldman, G. G. Havers, M. W. P. Hudson, I. C. James, I. D. Jones, R. N. Jones, Agnes W. O. Kennedy, F. B. Mallinson, Ruth E. Mansfield, P. J. Nagle, P. M. Overton, C. B. Picken, R. A. C. Rice, A. D. Woolf, and Tamsin M. Wynter.

The following examiners were elected for the ensuing year:—

Dental Surgery.—Surgical Section: Mr. C. E. Shattock, Mr. E. G. Slesinger, Mr. C. P. G. Wakeley, Mr. Reginald Vick, Mr. P. H. Mitchiner, and Mr. Basil Hume. Medical Section: Dr. R. A. Rowlands, Dr. R. A. Hickling, Dr. A. H. Douthwaite, and Dr. Ernest Bulmer.

Primary Fellowship.—Anatomy: Mr. P. N. B. Odgers, Prof. H. H. Woollard, and Prof. R. B. Green. Physiology: Dr. D. H. de Souza, Prof. Hamilton Hartridge, Prof. Samson Wright, and Prof. John Mellanby.

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5 lb. heavier and were taller than other pupils entering the elementary schools, and that the latter were physically defective; and that the only way to put this right was through a proper system of open-air nursery schools.

Mr. JOHNSTON asked if the right hon. gentleman was aware that in addition to the 35 per cent. of recruits rejected as physically unfit, another 30 per cent. were rejected later as medically unfit. As there was genuine agreement on all sides of the House that something ought to be done to improve the nutrition of the people, would the Prime Minister provide an opportunity for discussing the matter?

Mr. BALDWIN said that if the question was raised it would be discussed. This was a matter which the Government now had in hand.

Nutritive Values of Foods

Mr. LENNOX-BOYD asked the Minister of Health whether he had any statement to make on the fact, quantitative and qualitative, in relation to the diet of the people, or any proposals to effect changes therein which might appear desirable in the light of modern advances in the knowledge of nutrition.—Mr. SHAKESPEARE, Parliamentary Secretary to the Ministry of Health, replied: These questions have been referred to the Advisory Committee on Nutrition. As regards the facts the committee have reported that the available data are insufficient and have recommended the collection of further particulars. The committee have, however, recently stressed the importance of milk as a food.

Mr. SANDYS asked the Minister of Health the present average daily consumption per head of milk; and, in view of the conclusions of the recent report of the Advisory Committee on Nutrition, what steps he proposed to take further to increase it.—Mr. SHAKESPEARE replied: The present daily consumption of liquid milk in this country is estimated at slightly less than half a pint per head. The Government accept the views expressed by the advisory committee as to the high value of milk as a food, and schemes for the provision of milk, either free or at cheap rates, to mothers and children are now in operation. The Government will give consideration to the further development of these schemes, but this must await the general review of milk policy which will take place when the report of the Milk Reorganisation Commission is available.

Replying to Miss Horsbrugh, Mr. Shakespeare said that he fancied it was the case that the half-pint per head included the milk supplied in schools.

TUESDAY, JUNE 16TH

Dietaries in Scottish Prisons

Mr. JOHNSTON asked the Secretary of State for Scotland whether he would give for each of the five rates of dietaries in use in Scottish prisons the approximate cost of the food supplied to the prisoners per day; and what steps, if any, he proposed to take to ensure that the law-abiding working classes should be at least as well fed as the inmates of prisons, whose diet was prescribed by the regulations approved in June, 1931, and amended in August, 1932, and March, 1933.—Sir GODFREY COLLINS replied: The approximate wholesale cost of the ingredients of the items in the Dietary Rates per person per day in 1935 is as follows:—

Rate I.	4¾d.	Rate IV.	6¾d.
,, II.	5d.	,, V.	8½d.
,, III.	5½d.		

The costs would, of course, be higher if the ingredients had to be purchased at retail prices. In view of these figures I am unable to accept the suggestion made in the last part of the question.

Mr. JOHNSTON asked if the right hon. gentleman had not been assured by his medical advisers in charge of these prisons that the prison population were better fed after a period in prison than they were when they entered.

Sir G. COLLINS said that not only was the dietary better, but the regular life they led and the work they did had some bearing on this point.

MEDICAL NEWS

University of Cambridge

The general board propose to establish a post of assistant director of research in medicine. The holder will work at Addenbrooke's Hospital and the laboratories of the university under the direction of the regius professor of physic. If the appointment is made it will be for an initial period of three years at £700 a year.

On June 12th the following degrees were conferred:—

M.D.—Charles Hill.
M.B., B.Chir.—H. F. Anderson, D. N. Matthews, and J. D. M. Jones.
M.B.—C. A. Dowding.
B.Chir.—E. M. Darmady.

Royal College of Surgeons of England

A meeting of the council was held on June 11th, with Sir Cuthbert Wallace, the president, in the chair. Prof. Einar Key, of Stockholm, was admitted an hon. fellow of the College, and the honorary college medal was presented to Dr. J. A. Murray, F.R.S. Mr. R. M. Vick was re-elected to the court of examiners, Mr. W. Sampson Handley was reappointed as representative of the College on the court of governors of the University of Sheffield, and Dr. John Beattie was appointed as representative on the British National Human Heredity Committee. The Hallett prize was awarded to Kenneth William Starr of the University of Sydney, and the Sir Gilbert Blane medals to Surgeon Captain D. H. C. Given and to Surgeon Commander M. B. Macleod.

Diplomas of fellowship were granted to the following:—

A. S. Wesson, M.R.C.P. Lond., Univ. Coll.; D. C. Price, M.B. Lond., St. Bart.'s; Jean M. Dollar, M.B. Lond., Royal Free; G. S. Seed, M.B. Leeds, St. Bart.'s and Guy's; N. S. I. Narasimhan, L.R.C.P. Lond., Madras and Guy's; A. G. Williams, M.B. Wales, St. Bart.'s; E. R. G. Passe, L.R.C.P. Lond., St. Thomas's; R. H. Young, M.B. Camb., St. Thomas's; C. F. Evans, L.R.C.P. Lond., Melb. and Edin.; K. H. C. Hester, M.B. Lond., Guy's; L. W. Lauste, M.B. Lond., St. Thomas's; A. L. Kenyon, M.B. Manch.; O. J. Vaughan-Jackson, B.M. Oxon., London; J. R. Blackburne, M.B. Lond., St. Bart.'s; G. H. C. Ovens, M.B. Lond., St. Mary's; W. M. Capper, M.B. Lond., St. Bart.'s; Alan Bowen-Davies, M.B. Camb., Guy's; A. G. Cross, M.B. Camb., St. Mary's and London; Bodo Schulenburg, M.B. Cape Town, St. Thomas's and St. Bart.'s; Ralph Shackman, M.B. Lond., St. Bart.'s and Sheffield; S. A. Mian, M.B. Punjab, London; R. L. Benison, M.B. Camb., St. Bart.'s; A. E. De Sa, M.B. Bombay, Univ. Coll.; J. D. Fergusson, M.B. Camb., St. Thomas's; F. I. Evans, L.R.C.P. Lond., Camb. and Guy's; S. Y. Feggetter, M.B. Durh.; G. N. Sen, M.B. Calcutta, St. Bart.'s; S. M. Thompson, L.R.C.P. Lond., Leeds; J. G. Bonnin, M.B. Melb.; T. M. d'Offay, M.B. Edin., Sheffield; F. G. Fenton, M.B. Melb., Guy's; R. W. S. Fox, M.B. Melb., Guy's; C. H. W. Lawes, M.B. Sydney, St. Bart.'s; Ruby G. Sharp, M.B. Cape Town, Guy's; Jacob Sherne, M.B. Leeds, Guy's; W. H. M. Smith, M.B. Edin., Liverp.; K. W. Starr, M.B. Sydney; J. C. Stewart, M.B. Melb., London; R. R. S. Strang, M.B. Glasg., Univ. Coll.; and Gerald Townsley, M.D. Belf., Univ. Coll.

Diplomas of membership were granted to Gordon Williams and Walter L. Isaac, of St. Mary's Hospital, and diplomas in anæsthetics were granted jointly with the Royal College of Physicians to the following:—

R. A. Beaver, Donald Blatchley, Henry Canwarden, J. A. Carman, Bernard Coden, Phyllis F. L. Daplyn, C. J. M. Dawkins, M. M. Deane, Margaret L. A. Galbraith, Harry Grant-Whyte, V. A. Goldman, G. G. Havers, M. W. P. Hudson, I. C. James, I. D. Jones, R. N. Jones, Agnes W. O. Kennedy, F. B. Mallinson, Ruth E. Mansfield, P. J. Nagle, P. M. Overton, C. B. Picken, R. A. C. Rice, A. D. Woolf, and Tamsin M. Wynter.

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St. Mark's Hospital, London

On June 11th Lord Harewood laid the foundation-stone of the nurses' home at this hospital which is to be the first stage of a big reconstruction scheme. The home is to accommodate 50 nurses and 27 maids, and it is afterwards proposed to increase the number of beds in the hospital to 95, to provide a second operating theatre, and to enlarge the cancer research laboratories and the out-patients' and X ray departments. Approximately £40,000 is still needed to complete the work.

Rehabilitation of Persons Injured by Accidents

The Home Secretary, the Minister of Health, and the Secretary of State for Scotland have appointed Dr. J. F. E. Prideaux, an assistant director of medical services at the Ministry of Pensions, to be a member of the Interdepartmental Committee appointed last April to inquire into the arrangements made in this country for the restoration of the working capacity of persons injured by accidents.

Worthing Hospital

Work has been begun at this hospital on the erection of a maternity home at a cost of £13,840, and the contract has been signed for the building of a children's ward. The governors are considering the adoption of the federated superannuation scheme for nurses and hospital officers. Mrs. Arthur Lloyd, of Washington, has promised to give the hospital a deep X ray therapy apparatus. There is an excess of expenditure over income of £4206, and though Worthing has now a population of nearly 60,000, regular subscribers to the hospital number only 600.

Vacancies

For further information refer to the advertisement columns

All Saints' Hospital for Genito-urinary Diseases, Austral-street, West-square, S.E.—Hon. Pathologist.
Ashton-under-Lyne District Infirmary.—H.S., at rate of £150.
Bedford County Hospital.—First H.S., at rate of £155.
Birmingham and Midland Eye Hospital.—H.S., at rate of £130.
Birmingham City, P.H. Dept.—Two Res. Asst. M.O.'s, each £400.
Birmingham, Ear and Throat Hospital.—Second and Third H.S., each at rate of £150.
Birmingham Selly Oak Hospital.—Res. Surgeon, £700. Pathologist, £750. Also Radiologist, £800.
Blackburn County Borough.—Asst. Dentist, £450.
Blackburn Royal Infirmary.—Res. H.P., £175.
Bolton Royal Infirmary.—H.S., £125.
Bradford New Royal Infirmary.—Two H.S.'s, each £135.
Brecon County.—Asst. M.O., £500.
Brighton, Royal Sussex County Hospital.—Cas. H.S., £120.
British Postgraduate Medical School, Ducane-road, W.—H.P.
Burnley, Municipal General Hospital.—Jun. Res. M.O., £150.
Burton-on-Trent General Infirmary.—H.S., £150.
Cambridge, Addenbrooke's Hospital.—Res. Anæsthetist and Emergency O., at rate of £130.
Canterbury, Kent and Canterbury Hospital.—H.S., at rate of £125.
Cardiff, Llandough Hospital.—Sen. Res. Surg. O., £450.
Charing Cross Hospital, W.C.—Hon. Asst. Radiologist.
Chesterfield and North Derbyshire Royal Hospital.—Cas. O. and Fracture H.S., at rate of £200.
Chichester, Royal West Sussex Hospital.—Sen. and Jun. H.S., £175 and £125 respectively.
Colchester, Essex County Hospital.—H.P., £150.
Connaught Hospital, Walthamstow, E.—H.S. and Cas. O., each at rate of £100. Also Clin. Asst., 1 guinea per session.
Derby, Derbyshire Royal Infirmary.—Gynæcological H.S. and Emergency Anæsthetist, £150.
Derbyshire Education Committee.—Asst. School M.O., £600.
Doncaster Royal Infirmary.—H.P., £175.
Dorchester, Dorset County Hospital.—H.S., at rate of £150.
Dorset County Council.—Clin. Tuber. O., £750.
Dover, Royal Victoria Hospital.—Res. M.O., £180.
Ealing, King Edward Memorial Hospital.—Cons. Phys. for Children. Also Cons. Dental Surgeon.
Eastbourne, Princess Alice Memorial Hospital.—Res. H.S., £150.
Edinburgh, National Committee for the Training of Teachers.—Lecturer for Dunfermline College of Hygiene, &c., £500.
Edmonton, North Middlesex County Hospital.—Res. Asst. M.O., £400. Also Jun. Asst. Res. M.O., at rate of £250.
Golden-square Throat, Nose, and Ear Hospital, W.—H.S., £100.
Great Yarmouth General Hospital.—H.S., at rate of £140.
Greenwich Metropolitan Borough.—Tuber. O. for Council's Dispensary and Deputy M.O.H., £750.
Grosvenor Hospital for Women, Vincent-square, S.W.—Hon. Anæsthetist.
Hastings, Royal East Sussex Hospital.—Jun. H.S. and Temp. H.S., at rate of £150 and £200 respectively.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P., at rate of £50.
Hospital for Sick Children, Great Ormond-street, W.C.—Cas. M.O., £175.
Hospital of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Res. H.P., at rate of £100.
Indian Medical Service.—Commissions.
Ipswich, East Suffolk and Ipswich Hospital.—H.S. to the Asst. Surgeons, at rate of £144.
Isleworth, West Middlesex County Hospital.—Asst. M.O., £400.
Kidderminster and District General Hospital.—Sen. and Jun. H.S.'s, £150 and £100 respectively.
Leeds General Infirmary.—Hon. Surgeon.
Liverpool Sanatorium, Delamere Forest, Frodsham.—Second Asst. to Med. Supt., £250.
London County Council.—Asst. M.O. (Grade I.), £350. H.P., at rate of £120. Also Temp. Dist. M.O., at rate of £125.
London Hospital, E.—First Asst. and Reg. to Children's Dept., £300.
London Lock Hospital, Dean-street, W.—Surg. Reg., £100.
London Lock Hospital, 283, Harrow-road, W.—Res. M.O., at rate of £175.
London University.—Examinerships.
Maidstone, Kent County Ophthalmic and Aural Hospital.—H.S., at rate of £200.
Manchester Royal Children's Hospital, Pendlebury.—Res. M.O. and Res. H.S., at rate of £125 and £100 respectively.
Manchester Royal Infirmary.—Chief Asst. to Surg. Units, £250. Also Cardiographic Registrar and Res. Clin. Pathologist, each £150.
Manor House Hospital, Golders Green, N.W.—Jun. M.O., £200.
Marie Curie Hospital, Fitzjohn's-avenue, N.W.—Res. M.O., £100.
Medical Research Council, 38, Old Queen-street, S.W.—Research Worker, £500.
Metropolitan Hospital, Kingsland-road, E.—M.O. for Jewish Out-patients, £100.
Middlesbrough, North Riding Infirmary.—Asst. Hon. Surgeon. Also third H.S., at rate of £125.
Middlesex Colony for Mental Defectives, Harper-lane, Shenley.—Second Asst. M.O., £460.
Northampton General Hospital.—Secretary-Superintendent, £600.
North Riding of Yorkshire County Council.—Asst. School M.O., £500.
Nottingham City.—Asst. Tuber. O., £500.
Nottingham City Hospital.—Res. Surg. O., £350.
Oxford County and City Mental Hospital, Littlemore.—Med. Supt., £950.
Oxford, Wingfield-Morris Orthopædic Hospital.—Res. H.S., £100.
Plymouth City General Hospital.—Jun. Asst. M.O., £250.
Princess Beatrice Hospital, Earl's Court, S.W.—Res. M.O., at rate of £150.
Princess Louise Kensington Hospital for Children, St. Quintin-avenue, W.—H.S., at rate of £120–£150.
Prison Service.—M.O., Class II., £525.
Putney Hospital, Lower Common, S.W.—Jun. M.O., at rate of £100.
Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—Fifth M.O. for Antenatal Dept.
Queen Mary's Hospital for the East End, Stratford, E.—Two Cas. and Out-patient Officers, each at rate of £150.
Queen's Hospital for Children, Hackney-road, E.—Res. M.O., at rate of £200. Also H.S. and Cas. O., each at rate of £100.
Royal Air Force Medical Service.—Commissions.
Royal Army Dental Corps.—Dental Surgeons.
Royal Chest Hospital, City-road, E.C.—Hon. Physician.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Hon. Asst. Aural Surgeon.
St. George's Hospital, S.W.—Res. Obstet. Asst., £100.
St. Paul's Hospital, Endell-street, W.C.—H.S., at rate of £100. Also Clin. Asst., £5 5s.
St. Thomas's Hospital, S.E.—Asst. M.O., at rate of £100.
Salford Royal Hospital.—H.S., at rate of £125.
Sheffield Royal Hospital.—Vacancies on Res. Med. Staff, at rate of £80.
Southampton, Isolation Hospital and Sanatorium.—Jun. Res. M.O., £200.
South Eastern Hospital for Children, Sydenham, S.E.—Jun. Res. M.O., at rate of £100.
Southern Rhodesia Medical Service.—Two Government M.O.'s, £600.
South Shields Ingham Infirmary.—Sen. and Jun. H.S., £200 and £150 respectively.
Stafford, Staffordshire General Infirmary.—H.P. and Cas. O., at rate of £150.
Stockport Infirmary.—H.S., £150.
Sudan Medical Service.—M.O., £E.720.
Sunderland Royal Infirmary.—H.S., £120.
Torquay Borough.—Deputy M.O.H., &c., £600.
Torquay, Torbay Hospital.—Hon. Anæsthetist.
Walsall County.—Asst. M.O.H., £500.
Warwick, Warwickshire and Coventry Mental Hospital.—Deputy Med. Supt., £600.
Watford and District Peace Memorial Hospital.—Pathologist, £250.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Jun. Res. H.S., £100.
West London Hospital, Hammersmith-road, W.—Pathologist, £750. Also Res. Anæsthetist, at rate of £100.
Westminster Hospital, Broad Sanctuary, S.W.—Hon. Anæsthetist.
Wigan, Royal Albert Edward Infirmary and Dispensary.—H.S., at rate of £150.
Willesden General Hospital, Harlesden-road, N.W.—Hon. Clin. Asst. to Skin Dept. Also Res. Cas. O., at rate of £100.
Winchester, Royal Hampshire County Hospital.—Res. Surg. O. and H.P., at rate of £200 and £125 respectively.
Windsor, King Edward VII. Hospital.—Two H.S.'s, each £100.
Wolverhampton Royal Hospital.—H.S. and Asst. Res. M.O., each at rate of £100.
Woolwich and District War Memorial Hospital, Shooter's Hill, S.E.—H.S., at rate of £100.
Worcester Royal Infirmary.—Hon. Physician. Also Hon. Physician for Clinic of Psychological Medicine.
Worksop, Victoria Hospital.—Jun. Res., at rate of £120.
York City.—Asst. M.O.H., £600.

The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at Nantwich, Cheshire.

Appointments

AGAR, HERBERT, M.B. Lond. & Leeds, F.R.C.S. Eng., has been appointed Resident Surgical Officer, St. James's Hospital, Leeds.

COHEN, H., M.B. Edin., Junior Surgical Registrar at the Royal Victoria Infirmary, Newcastle-upon-Tyne.

COOPER, H. ASTLEY, M.D., M.R.C.P. Lond., D.P.M., Deputy Medical Superintendent at the Knowle Mental Hospital, Fareham.

DAVIDSON, ANDREW, M.D. Glasg., D.P.H., County Medical Officer of Health and School Medical Officer for the North Riding of Yorkshire.

GALLOWAY, J. F., M.D. Liverp., D.P.H., D.P.M., Medical Officer of Health for Dewsbury.

JOHNSTONE, A. S., M.B., F.R.C.S. Edin., D.M.R.E., Assistant Radiologist at the Leicester Royal Infirmary.

LYLE, T. KEITH, M.D., M.Chir. Camb., M.R.C.P. Lond., F.R.C.S. Eng., Assistant Surgeon to the Royal Westminster Hospital.

MAGNUS, J. A., M.D. Heidelberg, L.R.C.P. Edin., Resident Surgical Officer at the Birmingham and Midland Eye Hospital.

MCCORMAC, J. S., M.B. Belf., Assistant Tuberculosis Officer for Stoke-on-Trent.

MACPHERSON, IAN, M.B. Leeds, Resident Medical Officer, St. James's Hospital, Leeds.

MONTGOMERY, J. A., M.D. Glasg., Resident Medical Officer at the Finchley, Hornsey, Wood Green, and Friern Barnet Joint Isolation Hospital, Muswell Hill.

O'SHEA, JOHN, M.Ch., F.R.C.S. Irel., Resident Surgical Officer at the Royal Manchester Children's Hospital, Pendlebury.

PARFITT, D. N., M.D., M.R.C.P. Lond., D.P.M., Medical Superintendent at the Warwickshire and Coventry Mental Hospital.

REDDINGTON, M. P., F.R.C.S., Hon. Assistant Obstetric Surgeon to the Woolwich and District Hospital Association.

TRAIL, J. D., M.B. Aberd., D.P.H., District Tuberculosis Medical Officer for the Durham County Council.

WEIR, J. A., M.B. Glasg., Junior Surgical Registrar at the Royal Victoria Infirmary, Newcastle-upon-Tyne.

Three Counties Hospital, Arlesey.—The following appointments are announced:—

MCCLURE, JAMES, M.D. Glasg., F.R.C.S. Eng., Consulting Surgeon;

YOUNG, J. B., M.D. Edin., M.R.C.P. Lond., Consulting Physician;

KIES, J. P., M.R.C.S. Eng., D.L.O., Consulting Ear, Nose, and Throat Surgeon; and

ARMSTRONG, H. M., M.B. Sydney, D.O.M.S., Consulting Ophthalmic Surgeon.

Certifying Surgeon under the Factory and Workshop Acts: Dr. A. DICKSON (Old Deer District, Aberdeen).

Births, Marriages, and Deaths

BIRTHS

CRAIG.—On June 4th, at Framlingham, the wife of Dr. D. M Craig, of a daughter.

DEWES.—On June 8th, at Cromwell-road, Kensington, S.W., the wife of Dr. Gordon Dewes, of a son.

FRIEDLANDER.—On June 13th, at Welbeck-street, the wife of Dr. H. R. Friedlander, of Beckenham, of a daughter.

HIGHAM.—On June 7th, at Devonshire-place, the wife of A. R. C. Higham, F.R.C.S. Eng., of a son.

HOBBS.—On June 12th, at Ealing, the wife of Dr. A. N. Hobbs, of a son.

LAWRENCE.—On June 8th, at Wolverton, Stony Stratford, the wife of Dr. E. D. Lawrence, of a son.

NICHOLAS.—On Wednesday, June 10th, at Truro, the wife of Dr. P. B. L. Nicholas, of a daughter.

PALMER.—On June 10th, the wife of Dr. Geoffrey Palmer, Auckland, N.Z., of a son.

PERROTT.—On June 5th, at Stanmore, the wife of Dr. G. F. Donaldson Perrott, of a son.

SAWLE THOMAS.—On June 9th, at Devonshire-place, W., the wife of Dr. J. Sawle Thomas, of a daughter.

STRATFORD.—On June 6th, at Hampstead, the wife of Dr. Martin Stratford, of Hatch End, Middlesex, of a son.

WILKIN.—On June 11th, at Gloucester, the wife of W. J. Wilkin, F.R.C.S. Eng., of a daughter.

MARRIAGES

HUDSON—ADLINGTON.—On June 9th, in London, Bernard Hudson, M.D., M.R.C.P., of Davos, Switzerland, to Laura Almon, younger daughter of Mr. and Mrs. Adlington, of Bath.

LOCKETT—BRADING.—On June 6th, at Emmanuel Church, Croydon, John Morton Lockett, M.R.C.S., to Barbara Cicely, youngest daughter of Mr. L. H. Brading, of Sutton, Surrey.

GOLDEN WEDDING

DAVIES—DIXON.—On June 16th, 1886, William Thomas Frederick Davies, M.B., B.S. Lond., son of Dr. Ebenezer Davies, medical officer of health for Swansea, to Florence, daughter of Thom..s Dixon. Present address: Mooi River, Natal.

DEATHS

DAVIES.—On June 11th, suddenly, in London, Conway Davies, M.B. Camb., M.R.C.P. Lond.

DU BUISSON.—On June 11th, at Hereford, Edward William Du Buisson, M.R.C.S. Eng., aged 73.

GILMOUR.—On June 10th, at Woodbridge, Percy Graham Gilmour, M.R.C.S. Eng.

MARTIN.—On June 11th, in London, Henry Charrington Martin, M.D. Edin., of Exmouth, aged 89.

WHYTT.—On Monday, June 8th, at Fulham, Alexander Whytt, M.D. Edin., late of Kenley, aged 64.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY, June 23rd.
Pathology. 8.30 P.M. Mr. Joseph Needham, D.Sc.: Chemical Aspects of Normal and Pathological Growth.
THURSDAY.
Urology. 8.30 P.M. Mr. Hugh Lett: On Urinary Calculi, with Special Reference to Stone in the Bladder.
SATURDAY.
Disease in Children. 2.30 P.M., Meeting at Addenbrooke's Hospital, Cambridge.

BRITISH PSYCHOLOGICAL SOCIETY.
Medical Section.
WEDNESDAY, June 24th.—8.30 P.M. (11, Chandos-street, W.), Dr. Rowland Hill: Somnifaine Narcosis.

MEDICO-LEGAL SOCIETY.
THURSDAY, June 25th.—8.15 P.M. (Manson House, 26, Portland-place, W.), Annual General Meeting. Mr. J. B. Montagu: The Development in Criminal Law and Penology since 1910.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Thornhaugh-street, W.C.
Fever Hospital Medical Services Group.
FRIDAY, June 26th.—4.30 P.M., Dr. A. Forrest: Some Aspects of Scarlet Fever and Current Methods of Control.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

MACALISTER LECTURE.
THURSDAY, June 25th.—9 P.M. (National Temperance Hospital, N.W.), Sir Francis Fremantle: A Doctor in Parliament.

INSTITUTE OF CHILD PSYCHOLOGY.
WEDNESDAY, June 24th.—6.15 P.M. (Friends House, Euston-road, N.W.), Dr. Ethel Dukes: The Changing Needs of the Young Child. 8.15 P.M., Dr. Margaret Lowenfeld: Place of Emotion in the Formation of Character.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
MONDAY, June 22nd.—2.15 P.M., Dr. Duncan White: Radiological Demonstration. 3.30 P.M., Miss L. Martindale: Radiation Therapy in Gynæcology.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2.30 P.M., clinical and pathological conference (surgical).
THURSDAY.—2 P.M., Prof. J. C. Windeyer: Diagnosis and Treatment of Some Common Obstetrical Abnormalities. 3 P.M., Dr. R. A. Young: Non-tuberculous Pulmonary Diseases.
FRIDAY.—2.15 P.M., Dr. A. A. Davis: Gynæcological Pathology. 2.30 P.M., Mr. Tudor Edwards: Thoracic Surgery.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics or operations, obstetric and gynæcological clinics or operations.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.
WEDNESDAY, June 24th.—4 P.M., Mr. E. Pearce Gould: Modern Operations for the Cure of Inguinal Hernia.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, June 22nd, to SUNDAY, June 28th.—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W. Afternoon M.R.C.P. course in neurology and psychopathology.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. Tues. and Thurs., 8 P.M., clinical and pathological M.R.C.P. course.—BROMPTON HOSPITAL, S.W. Afternoon M.R.C.P. course in chest diseases.—PRINCE OF WALES'S GENERAL HOSPITAL, Tottenham N. Sat. and Sun., course in general surgery.—PRESTON HALL, near Maidstone, Kent. Sat., special demonstrations on pulmonary tuberculosis.—Courses are open only to members.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
WEDNESDAY, June 24th.—2 P.M., Mr. Charles Donald: Peritonitis: Acute and Chronic. 3 P.M., Dr. W. G. Wyllie: Typhoid and Paratyphoid.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.
THURSDAY, June 25th.—3 P.M., Dr. S. Nevin: Demonstration.

UNIVERSITY OF BIRMINGHAM.
TUESDAY, June 23rd.—3.30 P.M. (General Hospital), Dr. E. W. Assinder: Neurosyphilis.
FRIDAY.—3.30 P.M. (Queen's Hospital), Dr. W. Carey Smallwood: Diseases of the Red Blood-cell.

NOTES, COMMENTS, AND ABSTRACTS

A HOME FOR TUBERCULOUS NURSES

THE Minister of Health, accompanied by Dr. A. S. McNalty, visited the Papworth Village Settlement on June 12th to lay the foundation-stone of a new home for tuberculous nurses. Sir Kingsley Wood was introduced by Alderman Mrs. Keynes, who spoke as one who had watched Papworth's progress from inception. She said that the scheme was devised by the matron of Papworth, Miss Borne, in view of the urgent need of nurses who had lost their health. The scheme had been welcomed by the nursing profession and there was already a waiting-list for admission. Sir Kingsley Wood said that tuberculosis of every kind was steadily declining in this country. In 1911 there were over 53,000 deaths from all forms of tuberculosis; in 1935 the deaths had declined to some 29,000 out of a larger population. This meant that the death-rate per million had been more than halved in 24 years. Another criterion of progress was the number of notifications of new cases. In 1926 the total notifications were 79,654; in 1935 the figure was 59,623—a drop of 25 per cent. Many important factors had played their part in conquering the disease, like better housing and nutrition, improved hygiene, and increased knowledge. Papworth, the pioneer village settlement in this country, had its origin in the recognition of the fact that the main obstacle to the complete efficiency of sanatorium treatment was the difficulty of satisfying the need for adequate protection and care of the patient during the critical years that supervene after discharge from the sanatorium. The settlement was essentially a preventive measure as it afforded the best possible protection to the family of the tuberculous patient. It was the proud boast of Papworth that not one of the many children of tuberculous patients who had lived in the settlement had developed tuberculosis. It was now proposed, he said, to build a home for the after-care of nurses who had contracted tuberculosis in the course of their duties. Since 1930 Papworth had found it possible to employ some nurses who had originally come to the settlement as patients, either in the wards, or in the industries under sheltered conditions, during the critical years following discharge from the sanatorium; and the idea of the present scheme was to offer the same opportunity to a larger number of nurses. Sir Pendrill Varrier-Jones, the medical director, proposed a vote of thanks to the Minister for his visit.

NEW REGULATIONS FOR THE M.C.O.G.

WHEN the examination for admission to membership of the British College of Obstetricians and Gynæcologists was first instituted, the candidates as a rule were working in recognised hospitals and were therefore personally known to members of the Council. With the development of the College at home and overseas, however, it has become necessary to revise the regulations and to make the examination not only a test of knowledge and experience but also a guide to the training of candidates. To ensure that the holders of the diploma should have had a sound clinical training, candidates must have been registered as medical practitioners, or entitled to registration, for at least three years. They must produce certificates that they have held resident appointments each for at least six months at an approved hospital in general medicine or surgery, in obstetrics, and in gynæcology. They must also submit records of 25 obstetrical and 10 gynæcological selected and personally attended cases, which they must be prepared to discuss, and two commentaries either on individual cases or on selected groups of cases. Finally there is a written examination of two papers on the anatomy, physiology, and pathology of the female reproductive organs, and on gynæcology and obstetrics, to be followed by a clinical and a viva-voce examination. Each part—the written, the clinical, and the viva voce—will be conducted by a different pair of examiners. These revised regulations will take effect after the examination held in July.

THE ART OF THE UNCONSCIOUS

AN exhibition of peculiar interest to the medical profession and especially to psychologists opened on June 11th at the New Burlington Galleries. The artists represented belong to the Surrealist movement, a group which, drawing on Freud and Marx for a justification and theoretical basis, endeavour to serve up their unconscious in the raw, heedless of mere striving after form or composition. This is not to say that there is no form or composition; on the contrary, the apparently superb indifference on the part of many of these displayed subconscious minds to anything other than form, reveals the link between surrealism and abstract art. We are told by Prof. Herbert Read in the catalogue, however, that "The work of art is to be judged in the first place, not by its physique, but by its imaginative scope, its intimate revelations . . . it is beside the point to talk of form and composition." This is probably why such bizarre objects and media are used; it is much harder to view a test-tube, buttons, or a kipper dangling from a few bits of wood and ironmongery as pure form than as evocative symbols; and the same applies to various "natural and familiar objects," such as the piece of dead wood found and shown by Mr. Paul Nash. The walls might be described as covered with private nightmares, and these suggest that the farther we delve into the mind the more universal becomes the structure (as in ontogeny) subject, that is, to the particular symbolic garments that the artist's circumstances supply. The mere spectator may recoil, but that is the aim of the exhibition: art still holds the mirror up to Nature, but the glass is not entirely one of fashion, nor the mould of form. It is a glass depicting in fantasy the fulfilment of wishes that are incapable of real satisfaction: in Bacon's words "(Poesy) seems to bestow upon human nature those things which history denies to it; and to satisfy the mind with the shadows of things when the substance cannot be obtained." It is, in fact, more than an analogy to compare a hysterical fit with a work of art: both may be regarded as the indirect disguised emergence into conscious life of a repressed wish. The surrealist tries to play the part of the analyst; he strives to reconcile the conscious with the unconscious mind, even though he believes that this is only completely possible in a society based on coöperation rather than competition.

In these endeavours he is not confined purely to art. At the private view, a tall spectre in a white silk wedding-dress paraded round with her head completely enveloped in rose petals, holding in her arms a stockinged dummy leg. Many previous public occasions of this movement and its predecessor appear to have begun with a practical joke and ended in riot, and there was a general air of relief that the organisers, possibly out of respect for English gentility, had restrained their subconscious minds to this mild expression. It is to be hoped that the public will be allowed to admire the pictures, many of which are extremely good, undistracted by stark ids "oop fer t'Coop."

SNAKE-BITE SERUM.—Messrs. Allen and Hanburys Ltd. ask us to point out that supplies of serum for use in cases of snake-bite are obtainable by day or night from their premises at 7, Vere-street, Cavendish-square, London, W.1.

MONTAGU HOSPITAL, MEXBOROUGH.—This hospital is proposing to start a Coronation shilling fund by which it is hoped to raise £10,000 with the object of clearing the existing debt of £4000 and helping to provide funds for the opening of two new wards at present empty.